THE IRON AGE

A Review of the Hardware, Iron, Machinery and Metal Trades.

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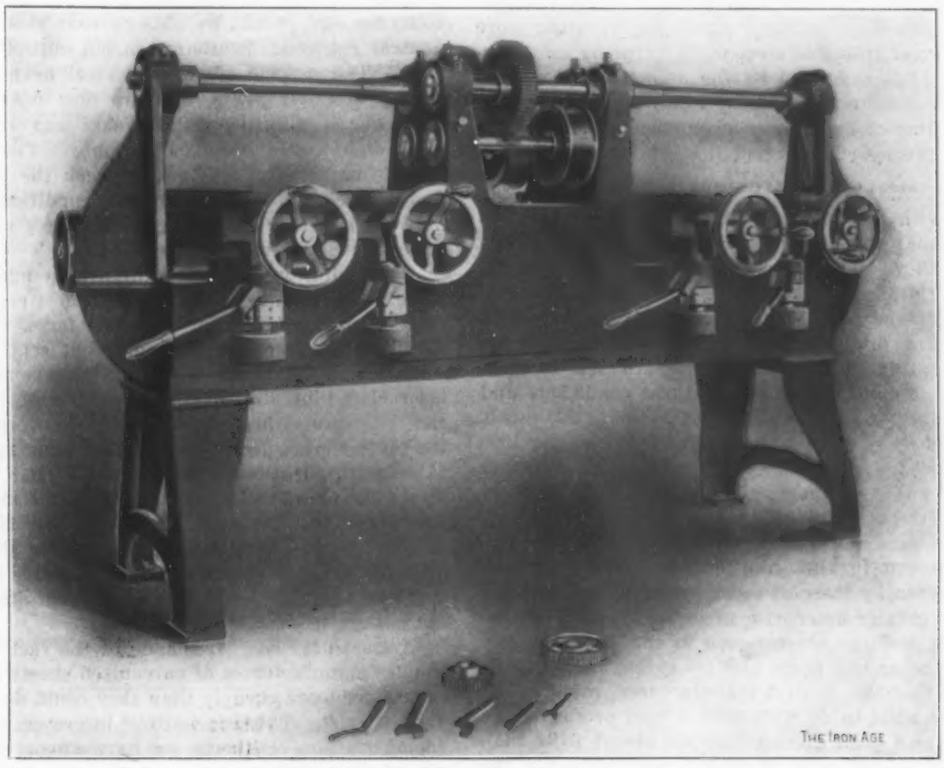
THURSDAY, MAY 19, 1904.

The Garvin Four-Slide Milling Machine.

The accompanying illustration shows a new machine which has just been brought out by the Garvin Machine Company, New York. It is a special type of milling machine adapted for manufacturing operations, such as the cutting of oil grooves in automobile axles, key seating, fluting, notching, squaring ends, flatting, &c., and was designed with the express intention of making possible a maximum output.

The machine is virtually four separate machines reduced to their simplest elements, combined in a small compass and to be operated by one man. Each slide is independent, consequently three slides may always be working while the fourth is being loaded, so that the machine is constantly in operation. There are two cutter spindles, each equipped with powerful back gears. One spindle serves the two slides on the right end of the machine, and the other the two on the left. The spindles also are independent, so that one side of the machine can be kept at work while the cutters on the other side are being changed or ground.



THE GARVIN FOUR-SLIDE MILLING MACHINE.

The slides feed by power or by hand through a feeding screw, which allows a travel of 12 inches, and is provided with an automatic trip. Independent vertical screw adjustments are possible to the slides for setting work of different sizes or to allow for wear and variation in the cutters. In addition to the vertical screw adjustment, each slide has a quick lifting movement through spiral roller collars operated by levers which may be seen on the front of the machine. These are used for sinking to the depth of the cut or dropping out on the return, &c. There are 12 changes of feed driven from the countershaft.

A modification of the machine has adjustable spindles of the Lincoln miller design, giving a larger vertical range.

H. J. Miller's Sons, Bridgewater, Mass., have recently received a large order for wire nail machines from South America.

The Pittsburgh Terminal Warehouse & Transfer Company.

Arrangements have been made by the Pittsburgh Terminal Warehouse & Transfer Company for the sale of an issue of $1,000,000 in bonds to the Pittsburgh Trust Company, and bids have been asked for the building of 38 warehouses to be erected between South Third and South Fourth streets, on the South Side, Pittsburgh, this summer. The undertaking is probably the largest of its kind ever started in Pittsburgh. The total cost of the buildings will approximate $2,000,000, and the total investment, including land purchased, will aggregate nearly $4,000,000.

Plans have been prepared for the erection of the warehouses on a plot of ground, running from Carson street to the Monongahela River, of over 223,000 square feet. Each warehouse will be six stories high, and the total floor space will be about 25 acres. The warehouses will be so arranged that a new street can be opened through the center of the tract from Carson street to the river, and room will be provided in the basement for the storage of 100 freight cars. Connection will be made with all railroads entering Pittsburgh, and every facility will be afforded in the warehouses for the shipment of freight as though the freight depot of the separate railroad was located there. Several of the warehouses are already rented, and it is believed that when the whole block is completed, by next April, all will be rented.

The company have a capital of $2,000,000 and a bond issue of $1,000,000. In the arrangement with the Pittsburgh Trust Company the Terminal Company deposit $500,000 cash and agree after five years to deposit with the trustees $25,000 each year to redeem the bonds, reserving the right to redeem them at 105 and interest. It is estimated that the net earnings will be 10 per cent. on the capital. James I. Buchanan, president of the Pittsburgh Trust Company, is president; Capt. James A. Henderson, president of the Pittsburgh & Cincinnati Packet Company, vice-president; G. W. C. Johnston, sec-

retary and treasurer, and George M. Laughlin, vice-president of the Jones & Laughlin Steel Company, and George Heard, president of the Natural Gas Company of West Virginia, directors.

The Condition of the British Iron Trade.

LONDON, May 7, 1904.—The most exhaustive statement yet made as to the condition of the British iron trade, particularly by those who are dissatisfied with present fiscal arrangements, was made by J. Stephen Jeans, secretary of the British Iron Trade Association, in his evidence before the Tariff Commission this week. An idea of the scope of the report which he presented may be obtained from the headings of the various sections, which follow: General statement as to value, iron ore conditions and supplies, fuel supplies, pig iron making conditions, conditions in the steel industry, iron trade burdens, influence of wages, cost of mineral transport, imports and exports, dumping and trusts, syndicates and bounties.

The general introduction may be passed over with only one refrence. Last year Mr. Jeans was authorized to issue blank forms to members of the association in order to ascertain their attitude in reference to the fiscal question, and the replies showed that "nearly 95 per cent. of the members making returns, representing more than 70 different iron and steel manufacturing establishments out of 225 embraced by the association, took the position that some reform of the existing situation was necessary, although hardly any suggestions were made as to what the precise character of that reform should be."

Steel Costs: A Comparison.

Dealing with the conditions in the steel industry, Mr. Jeans says that the question is sometimes asked, Why should not Cleveland, Wales and Lanarkshire produce blooms and billets as cheaply as they are imported? These districts have lately had cheaper pig iron than either Germany or America, and cheap pig iron is the basis of the ability to produce ulterior products cheaply. But when dumping is practiced, natural conditions and advantages are not generally allowed to count for much. It is not, then, a question of the price at which pig iron can be produced without loss, but the problem is rather to dispose of a certain quantity of material, with or without profit, in the largest and most readily available market.

Manufacturers in this country are blamed by outsiders, and often by their own countrymen, because they do not show greater enterprise in laying down large capacity plants, such as are common in the United States and are now being laid down to some extent in Germany. The truth is that the British manufacturer would not at present know what to do with such a vast product if he had it. Our own home market does not absorb more than 3,000,000 to 3,500,000 tons of steel a year, whereas the American market consumes nearly 15,000,000 tons and the German market consumes nearly 5,000,000 tons. The much greater output of a given steel plant in the United States than in any other country is partly due to the more suitable composition of the iron used, partly to more speedy methods of charging furnaces, and partly to the use of molten iron. Even when the plant employed is fully up to date, as it is in many English works, the quantity of steel produced is less than one-half, and sometimes less than one-third, the quantity produced in the best American practice. Most English engineers, on visiting American workshops, have been greatly surprised to see so few men about. Automatic machinery is much more largely used there than in this country.

Iron Trade Burdens.

The burdens that attend the manufacture of iron and steel in the form of rates, taxes, insurance, workmen's compensation, royalty, rents and so on are considerably more onerous in this country than in either the United States or Germany, when considered as a whole, but in individual cases there is probably a heavier burden in one or other of these countries. Thus, for example, Germany pays more for workmen's insurance against accidents than the average paid here. On the other hand, the United States have to pay considerably higher wages.

Hitherto the British iron trade has suffered from the want of a system of standard sections and specifications such as are, and have been for many years, applied in other countries. This source of inferiority and loss has now been removed. It has been computed that the reform may represent a value of £200,000 to £300,000 annually to the iron trades.

One of the greatest troubles that beset the iron trade of Great Britain to-day is a widespread want of confidence in its future. The doubts entertained as to the future of our supplies of iron ore have had some share in producing pessimistic ideas. One of the most serious burdens which the iron trade of this country, in common with other British industries, has of late years been called on to bear is the increase of income tax and local taxation The constantly increasing incidence of this burden is a serious matter for all industrial enterprise in Great Britain. Another considerable burden which has to be borne in the British iron industry is that of royalty rents.

The Effect of Dumping.

Concerning dumping, Mr. Jeans says it has been argued that if we can, through dumping, secure cheaper supplies of raw or semiraw material than competitive countries, we should be able to beat those countries in neutral markets. Statistics do not entirely support this view. The exports of German steel have doubled within the last few years, and are now nearly on a level with our own, although 20 years ago British exports were eight times those of Germany. The fact is that, while dumped steel may easily break the British market and entirely disorganize British conditions, its volume may not be either absolutely or relatively sufficient greatly to influence general competition.

The agitation that was carried on against dumping some time ago was partly founded on a more or less imperfect ascertainment of essential facts. While it was in vigorous progress a correspondent sent him a list of 20 iron works in South Wales which were alleged to have been closed by dumping. Four-fifths of the works on the list were either old finished iron works or obsolete tin plate works, and in both cases dumping had nothing to do with their becoming derelict. That the rank and file of the trade had a certain confidence in the future is proved by the fact that within the last 15 years about 26 steel works have been built in this district, whose capacity for producing steel to-day is twice as great as its greatest capacity for the production of finished iron in the past.

A good deal has been made of the fact that dumping enables manufacturers of galvanized sheets and tin plates to produce more cheaply than they could do if the system did not exist. This is a natural inference, but it requires demonstration. Hitherto we have almost had a monopoly of these two branches of trade, and that monopoly has not yet to any serious extent been broken. If Americans could get their labor costs of tin plate production down to the British level, he does not think that the difference in South Wales between home and foreign steel would prevent them from going far in occupying British markets, and so to a large extent with galvanized sheets.

Of machinery, the United States still suppply us with a larger value than any other country. This, however, is probably not entirely an unmixed evil. It is even possible that it may be a very real help. American machinery has been helpful in modernizing and economizing our processes of manufacture in many different lines of production.

Resources Greater Than Needs.

The general impression created by the recent history of dumping has naturally been that this country is unable to produce as cheaply as Germany and the United States. This, however, must not be taken for granted. In three districts in this country pig iron has been produced with profit within the last 12 years for 32 shillings per ton. For some months steel rails have been sold in this country for less than £3 15s. per ton. Sir C. Furness recently declared that a firm in the Cleveland district could make billets at 60 shillings per ton, which is a

lower figure than he (J. S. Jeans) had ever heard of for the Continent, and comes close to Mr. Schwab's irreducible minimum of $12 for American rails. This home cost, however, involves conditions which are not general in this country, although they may be made much more so—such as ownership of iron mines and collieries, private wharves, the utilization of by-products from coke ovens and blast furnaces and other sources of economy which have either been largely neglected in this country or been applied only to a limited extent.

If all British works were on navigable rivers or on the seaboard the economic results would be different, but that condition cannot be realized without heavy sacrifice and outlay of capital. In all countries alike the resources of production in the iron trade are generally largely in excess of actual needs, and this factor, as tending to depress prices and stimulate competition, including dumping, should not be overlooked. S. G. H.

The Pig Iron Warrant System.—The American Pig Iron Storage Warrant Company, 44 Wall street, New York, have issued a circular addressed to the pig iron producers of the United States, in which they set forth the progress of the movement for introducing into this country the English system of dealing in pig iron warrants on exchanges. The circular states that the company have received the signatures of officials of merchant furnace companies with an annual capacity of 3,900,000 tons to a card in favor of the movement. Officials of additional furnace companies representing 1,200,000 tons have agreed to lease ground to the Warrant Company and to deliver on it, graded and weighed, any iron for which their customers may wish to take out warrants. It would appear from this that the sentiment favoring warrant dealings is almost unanimous among the merchant furnaces. Warrants have been listed by the Pittsburgh Stock Exchange, and rules for the government of such sales are being considered. In New York arrangements have been made for dealing in warrants on the New York Produce Exchange. A list is given of pig iron firms who have either joined the exchanges referred to or else have made their arrangements for dealing through regular exchange members. The company state that in a few days everything will be ready for selling warrants on exchanges, and they desire the furnace companies to consider what amount of iron they wish to sell by warrant for spot or forward delivery, and to put the authority to make such sales into the hands of some one of the houses that have elected to take part in the selling movement. The Warrant Company will make favorable terms to the furnace companies on all such iron.

A Dispute Over the Clairton Ore Property.—Reports in the daily press that the sale of the plant of the Clairton Steel Company to the United States Steel Corporation may fall through, owing to the dispute which has come up between the Steel Corporation and W. P. Snyder, president of the Clairton Steel Company, are untrue, but the final consummation of the deal may be delayed. It appears that W. P. Snyder owns a half interest in a valuable ore property in the Mesaba region. When the negotiations were under way for the sale of the Clairton Steel Company's plant to the Steel Corporation the Crucible Steel Company of America put a price on this entire property, but when the time came to transfer the property to the Steel Corporation Mr. Snyder refused to accept the price offered for his half interest. He has made a counter proposition to buy the entire mine or sell his half interest at a certain price. A settlement of the matter has not yet been reached, but probably will be in a short time.

The steamship "La Lorraine," which sailed May 12 from New York bound for Havre, took out $9,020,023 in gold, which is far above the previous high record of gold shipped by any one steamer. The quantity of gold shipped abroad on this movement up to May 17 was $52,500,000.

Cross Bending Tests on Steel Concrete Beams.*

Through the courtesy of the St. Louis Expanded Metal Fire Proofing Company, St. Louis, Mo., I am able to give you the results of a series of tests recently made at the Rose Polytechnic Institute, under my direction, upon beams of concrete reinforced with corrugated steel bars. The object of the test was to obtain the actual strength in cross bending of full size concrete beams reinforced with corrugated bars, according to the formula of A. L. Johnson. It was afterward decided that, in conjunction with the determination of the cross bending strength, there should also be recorded the deflections and the movement of the neutral axis.

In order that the concrete and steel should represent products likely to obtain in practice, Atlas cement, bank sand, crushed rock and corrugated steel bars were purchased in the open market. The mixing was done by a local contractor of experience, with his own gang of men and in the manner he ordinarily employed. The quality

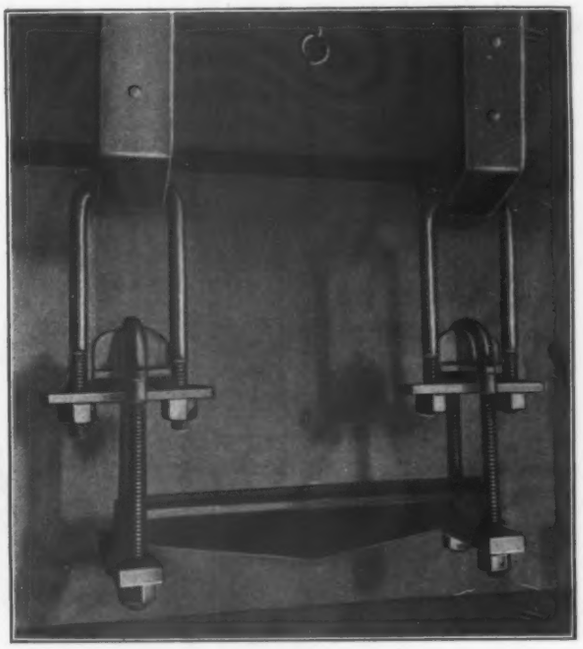


Fig. 1.—Stirrup for Supporting the Ends of the Beams.

of the materials was in general good. The cement was satisfactory in every way. The sand, while containing some "dirt" in the form of yellow clay, was a fair representation of bank sand used in Terre Haute. The crushed limestone was in two parts, one coarse and the other fine, the two mixed forming the run of the crusher. The coarse stone would pass a screen of 1½-inch mesh and would stop at one of ½-inch mesh; and the fine stone would all pass a screen of ½-inch mesh. The corrugated steel bars, when tested, showed an elastic limit of about 60,000 pounds and an ultimate strength of about 100,000 pounds. The areas of the bars were, in general, as advertised with the exception of the ¾-inch bars, which were found to be about 20 per cent. under size. The proportion of cement, sand and stone was practically 1 of cement to 7 parts of sand and stone. The mixing was done on a concrete floor. The dry materials were placed in layers in the following order: Stone, sand and cement. The mass was then turned twice dry and then twice wet, the water being introduced from a hose. The mixture was then shoveled into barrows and wheeled to the molds and dumped over the sides. Four to 6 inch layers were deposited the full length of the molds and tamped with iron tamping bars. The first two batches were moderately dry, and the others pretty wet and required but little tamping. Very rigid knockdown molds were used, and no special means employed to obtain a smooth surface on the

* Abstract of a paper read by Prof. Malvard A. Howe, Rose Polytechnic Institute, before the Western Society of Engineers, Chicago, April 16, 1904.

concrete, other than that given by mill finished lumber. The molds were not wet before being filled, and were not removed until the beam was to be tested. The beams were seasoned in basement rooms at a temperature of about 65 degrees F.

Table I.—Make-up and Dimensions of Beams.

Beam.	Made, 1903.	Concrete batch.	Number and size of steel bars.	Nominal areas.	Actual net areas of steel.	Distance center of steel below top of beam *d*.	Total depth of beam.	Breadth of beam.	Length of beam over all.
			In.	Sq.in.	Sq.in.	In.	In.	In.	Ft.In.
1	October 13...	1	2-½	0.36	0.36	4¼	5	12	12 0
2	October 13...	1	3-½	0.54	0.54	6¼	7	12	14 0
3	October 13...	2-3	4-½	0.72	0.72	8½	9½	12	17 0
4	October 14...	9	6-½	1.08	1.08	12¾	14	12	17 0
5	October 14...	5	2-¾	0.74	0.60	8¾	10	12	14 0
6*a*	October 14...	6	3-¾	1.11	0.90	13	14½	12	17 0
6*b*	October 14...	6	3-¾	1.11	0.90	13	14½	12	17 0
6*c*	October 14...	8	3-¾	1.11	0.90	13	14½	12	17 0
6*d*	October 14...	6-7	3-¾	1.11	0.90	13	14½	12	17 0
6*e*	October 15...	12	3-¾	1.11	0.90	13	14½	12	17 0
7*a*	October 13...	3-4	4-¾	1.48	1.20	17¼	19	12	19 6
7*b*	October 13...	4	4-¾	1.48	1.20	17¼	19	12	19 6
7*c*	October 14...9-10-11		4-¾	1.48	1.20	17¼	19	12	19 6
7*d*	October 14...	7	4-¾	1.48	1.20	17¼	19	12	19 6
7*e*	October 14...	9	4-¾	1.48	1.20	17¼	19	12	19 6
8	October 13...	2	2-⅞	1.10	1.06	12¾	14	12	17 0
9	October 13...	5	3-⅞	1.65	1.59	19¼	21	12	19 6
11	October 14...	8	2-1	1.40	1.40	16¼	18	12	19 6

Table I gives the general dimensions of the beams and the arrangement of the steel bars. Although the beams were widely different in the dimensions of length and depth, yet all were designed on the same basis, the same percentage of steel being intended for each beam.

In testing a beam the ends were supported in stirrups, free to swing on knife edges at about the center line of the beam, as shown in Fig. 1. Two equal concentrated loads were applied symmetrically about the center of the beam, through knife edges in rolling seats, thereby producing a constant bending moment between the points of application of the loads (excepting the variable moment produced by the weight of the beam). The rolling seats for the knife edges were supported by ¾ x 4 inch steel plates, bedded in plaster of paris on top of the beam. This arrangement is shown in Fig. 2 for beam No. 8.

The vertical deflections were read directly from a scale on the side of the beam at the center by means of a silk thread fastened opposite the knife edges of the end stirrup. Measurements for the determination of the relative positions of neutral axis, under different loads, were made in the following manner: Four yokes were fastened to the beam by conical points in the positions shown in Fig. 2. These were connected by wooden strips, and the relative positions of these at the top and bottom were determined by means of a silk cord fastened to one and running over a graduated arc fastened to the other. The first readings of the arcs were taken under a small initial load. The data obtained can best be illustrated by giving the complete notes for beam No. 8.

Beam No. 8.—Tested December 29, 1903.

Span, c-c of end stirrups.....15 feet.
Span, c-c of concentrated loads..... 5 feet.
Distance c-c of extensometers..... 6 feet.
Length, out to out, of beam.....17 feet 11 inches.
Weight of beam.....2,900 pounds.
Vertical distance between conical points of extensometer yokes .....12¾ inches.
Vertical distance between graduated arcs on extensometers .....27⅛ inches
(Lower arc opposite lower conical point.)

Total con. load. Pounds.	Vertical deflection at center.—Mm.	Upper arc.	Lower arc.	Remarks.
1,100	44.2	142.6	2.4	
2,100	44.8	141.4	2.6	
3,000	45.0	139.8	3.2	
4,000	55.6	137.4	4.2	
5,000	46.2	133.8	5.8	
6,000	47.8	128.2	8.4	
7,000	48.6	124.4	10.2	Crack 12 ins. E of W load.
8,000	49.8	120.0	13.0	Crack 6 ins. E of center, 8 ins. W of center, 14 ins. W of center, 4 ins. E of W load, 18 ins. E of W load.
9,000	50.8	115.6	15.0	
10,000	52.0	111.4	17.2	Crack under W load, shear crack 2 ins. above bottom, extending 18 ins. E of W load.
11,000	53.2	108.8	19.2	Crack 6 ins. W of E load.
12,000	54.4	107.2	21.6	Crack 12 ins. W of W load.
13,000	55.6	90.4	23.6	Crack under E load 15° with vertical.
14,000	56.8	93.4	25.6	
15,000	58.0	89.2	27.6	
16,000	59.2	84.6	30.0	Crack 6 ins. W of center.
17,000	60.6	80.0	32.0	
18,000	61.8	75.4	34.0	
19,000	63.0	70.0	36.4	
20,000	64.4	65.0	37.4	Longitudinal crack 5 ins. above bottom at both ends.
21,000	65.9	59.4	40.4	
22,000	67.5	53.4	43.2	
23,000	69.9	46.8	45.8	
23,200	95.0			
23,300	105.0	(Max. load.)		
22,765	135.0			
22,000	145.0	(Comp. failure 30 ins. W of center.)		

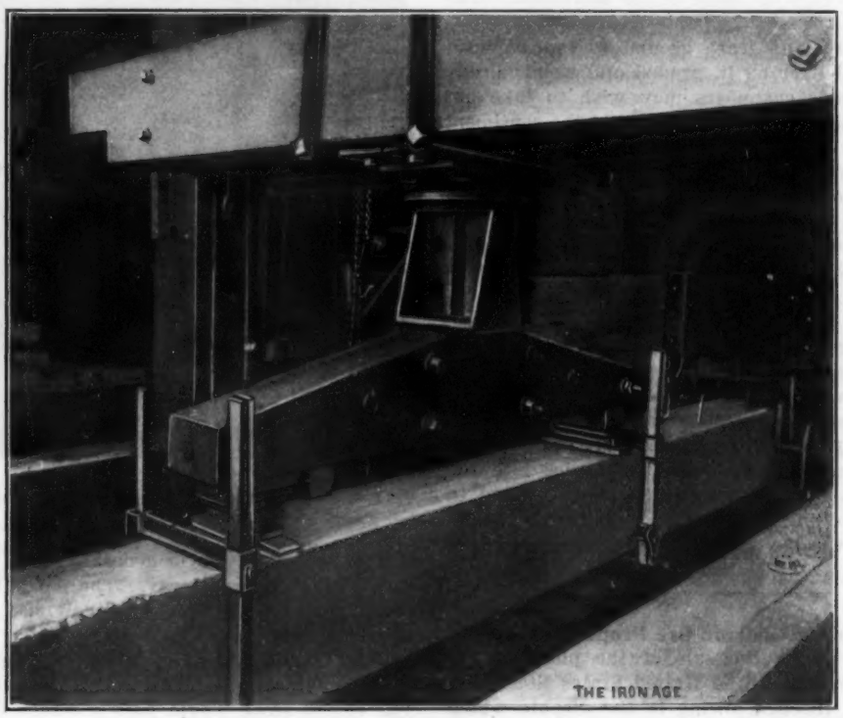


Fig. 2.—Means for Applying the Load at Two Points Near the Center.

Table II.—Maximum Loads and Moments.

Beam.	Age in days.	Span c-c end support. Ft.	In.	Distance between loading points. Ft.	In.	Total weight of beam. Lbs.	Total maximum load. Lbs.	Load when comp. failure was marked. Load falling off from maximum. Lbs.	Maximum moment 1000s of in pounds. Lbs.	Theoretical moment, Johnson's formula. Lbs	See footnote.
1	74	10	0	3	4	825	4,200	3,400	94.3	80.6	
2	76	12	0	4	0	1,150	8,100	5,100	212.2	174.2	
3	72	15	0	5	0	2,000	12,100	....	402.7	322.2	
4	73	15	0	0		2,860	19,400	....	929.8	725.0	1
5	71	12	0	4	0	1,700	11,900	....	311.9	283.0	
6a	71	15	0	5	0	2,935	18,300	....	607.2	625.0	
6b	69	15	0	5	0	2,950	19,325	16,500	638.3	625.0	
6c	115	15	0	5	0	2,450	20,400	19,100	666.3	625.0	
6d	29	15	0	3	0	2,960	15,500	....	616.8	625.0	2
6e	29	15	0	3	0	3,125	17,000	....	692.0	625.0	3
7a	78	18	0	6	0	4,450	30,000	28,500	1,189.4	1,121.0	
7b	78	18	0	6	0	4,325	29,000	23,600	1,152.0	1,121.0	
7c	70	17	9	6	0	3,800	30,100	....	1,142.9	1,121.0	
7d	68	18	0	8	0	4,450	29,900	....	1,006.4	1,121.0	4
7e	77	17	6	3	0	4,200	22,800	....	1,090.7	1,121.0	5
8	77	15	0	5	0	2,900	23,300	22,300	756.5	725.0	
9	77	18	0	6	0	4,850	34,800	....	1,373.7	1,652.6	6
11	75	18	0	6	0	4,225	29,000	25,700	1,149.3	1,177.8	

[1] 14,000 applied 6 feet 6 inches. Removed and loaded in center. Failed at load.
[2] Failed by comp. near center.
[3] Failure same as 6*d*. Made of gravel from pit.
[4] Several repetitions of load. Failed by shearing.
[5] Repeated loads. Failed by shearing.
[6] Failed by shearing.

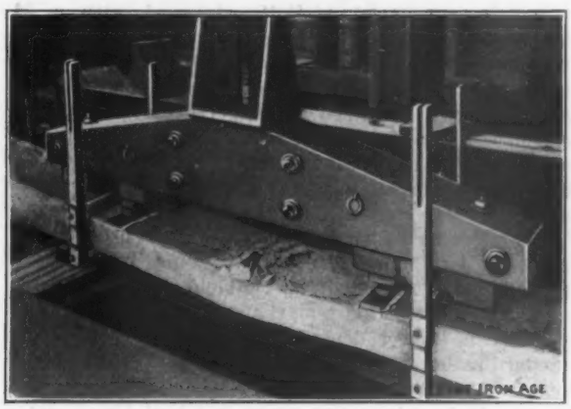


Fig. 3.—Beam No. 1. Depth, 5 Inches; Span, 10 Feet.

The general make-up of each beam is given in Table I. Table II gives the result of the tests in terms of the loads, bending moments and mode of failure. Table III was computed by Johnson's formula, using the value of y_1 obtained from the experiments. This value was, in most

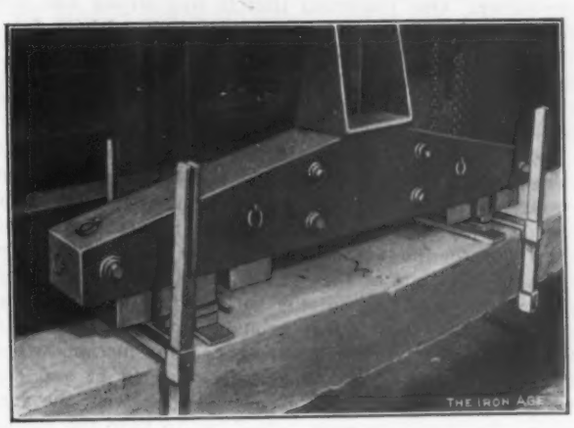


Fig. 4.—Beam No. 5. Depth, 10 Inches; Span, 12 Feet.

cases, found graphically. For four beams, however, it was computed, and the resulting values plotted. These lines showed that at the commencement of the loading the neutral axis was below the center of the beam. As the load increased in magnitude the axis moved upward very rapidly until cracks commenced to appear on the bottom of the beam; then the axis remained approximately in the same position as long as the concrete did not show signs of failure in compression, as indicated by the drop of the scale beam. At or near the end of the experiment the axis, sometimes, not always, dropped suddenly.

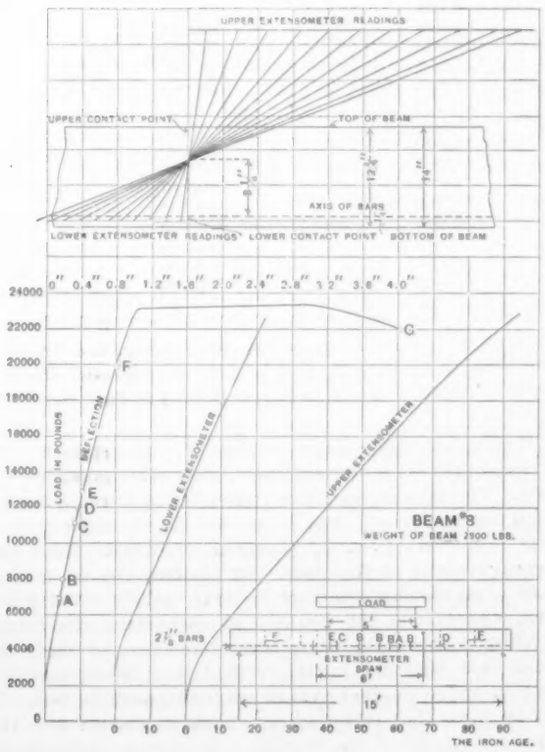


Fig. 5.—Location of the Neutral Axis, and the Curves of Deflection and Extensometer Readings. Beam No. 8.

Table III.—Fiber Stresses According to Johnson's Formula and Experimental y_1.

Beam.	Center of steel below top of beam, *d*. Inches.	Neutral axis below top of beam, y_1.	Maximum stress in concrete in compression. Pounds per square inch.	Concrete in tension. Pounds per square inch.	Steel in tension. Pounds per square inch.	Batch in top of beam.	See footnote.
1	4¼	0.45*d*	1,700	170	66,000	1	
2	6¼	0.45*d*	1,900	190	66,000	1	1
3	8½	0.38*d*	2,300	230	64,000	3	2
4	12¾	0.34*d*	2,500	250	64,800	9	3
5	8½	0.42*d*	1,500	150	60,500	5	
6a	13	0.37*d*	1,500	150	51,000	6	
6b	13	0.37*d*	1,500	150	54,000	6	4
6c	13	0.42*d*	1,400	140	58,300	8	
6d	13	...	....	...	....	7	5
6e	13	...	....	...	....	12	5
7a	17¼	0.39*d*	1,600	160	57,000	4	6
7b	17¼	0.53*d*	1,600	160	53,500	4	7
7c	17¼	0.36*d*	1,600	160	53,500	11	
7d	17¼	0.35*d*	1,400	140	47,600	7	8
7e	17¼	0.35*d*	1,600	160	52,200	9	8
8	12¾	0.36*d*	2,000	200	54,000	2	
9	19¼	0.40*d*	1,400	140	45,000	5	9
11	16¼	0.39*d*	1,700	170	50,500	8	10

[1] Reset upper arc at 6,000 pounds.
[2] Cord of upper arc touched at 7,000 pounds.
[3] Center load, hence axis may not be correctly located.
[4] Repeated loading.
[5] No records for y_1.
[6] Cord of upper arc touched at 25,000 pounds.
[7] Cord of lower arc touched at 6,000 pounds.
[8] Repeated loads and failed in shear.
[9] Failed in shear.
[10] Upper cord touched at 16,000 pounds.

The values of y are probably in error, but not enough to be of any practical importance. The travel of the neutral axis is correctly obtained by the methods employed (assuming that a plane section remains plane after its distortion of the fibers), but its exact location in reference to the center of the beam is not known, as the experiments were commenced under an initial load including the weight of the beam.

Table IV.—Fiber Stresses According to Common Theory and Experimental y_1.

Beam.	Max. comp. in concrete. Pounds per square inch.	Tension in concrete.	Tension in steel. Pounds per square inch.	Remarks.
1	2,120	Concrete assumed to take no tension.	76,500	See Table III.
2	2,380		76,500	
3	2,870		74,300	
4	3,100		75,500	
5	1,900		56,000	
6a	1,900		59,300	
6b	1,900		62,500	
6c	1,750		67,700	
6d	....		....	
6e	....		....	
7a	2,000		66,400	
7b	2,000		62,000	
7c	2,000		62,000	
7d	1,800		55,500	
7e	2,000		60,000	
8	2,500		64,200	
9	1,750		52,200	
11	2,100		58,100	

Table IV was computed, using the same values of y as employed in Table III, under the assumption that the concrete resisted no tension, and that in compression the distortion of the concrete was proportional to the stress producing it.

Throughout the entire series of experiments the curves of deflection and extension showed a marked similarity. The appearance after tests of two of the 18 beams tested are shown in Figs. 3 and 4. Fig. 5 shows a diagram prepared by T. L. Condron, M.W.S.E., from the original records of the tests. By plotting the upper and lower extensometer readings in their correct relative position as regards the beam, and connecting the corresponding points with rays, the intersection of these inclined rays with the initial vertical line determines the location of the neutral axis at each stage of the test. It will be noted that this diagram shows in another way the same movement of the neutral axis already referred to. The distance of the neutral axis above the plane of reinforcing is given for the highest position of the neutral plane and not for the position at the time of maximum load. The deflections are given in decimals of an inch. The extensometer readings are plotted as observed. Ten divisions on the extensometers equaled 0.03932 inch, or approximated 255 divisions to the inch.

The small circles and letters on the deflection curves indicate where fine hair cracks were first observed in the concrete on the tension side of the beam and the relative position of these first cracks is shown on the small sketches on the diagram.

The Iron and Steel Institute.

LONDON, ENGLAND, May 7, 1904.—On Thursday morning of this week there was a record muster of members of the Iron and Steel Institute for the annual spring meeting. Special interest was vested in this meeting owing to the presence in the chair of Andrew Carnegie, who conducted the proceedings with *bonhomie*, tact and pleasant humor. It was stated in the report that the membership roll now numbers 1781, an increase of 161 upon last year, while the finances are in a sound condition. Among the items of expenditure may be noted a subvention of £200 to the National Physical Laboratory and a further grant of £100 to the Engineering Standards Committee, as well as an annual subscription to the International Testing Association.

Sheffield men were very much to the fore throughout the proceedings. The Bessemer gold medal for 1904 was presented to R. A. Hadfield of Sheffield. In making the presentation Mr. Carnegie remarked that the Bessemer medal had never been presented with greater unanimity on the part of the Council, and said many kind things of Mr. Hadfield's unique establishment at the Hecla Works. In acknowledgment Mr. Hadfield made the humorous remark that the gold medal he received ought to have been made of Bessemer steel. If it were only possible to obtain some of Bessemer's original or first product from which to make the medals presented each year, how much more precious than gold would have been such a memento of a name and a material which had helped to revolutionize the world.

The Carnegie gold medal was awarded to Pierre Breuil of Paris, who created quite a wave of sympathy in a letter to the Council, in which he stated that, although he valued the great honor personally, he was especially glad to obtain it for the profound joy it would give to his parents, two old and infirm peasants living in a remote country village in France. Mr. Carnegie said it was to him a striking example of that nobility of character of which he was thankful to say the world still produced so many instances.

Coming to the papers read, the first day's proceedings were keenly canvassed, particularly the paper read by Cosmo Johns, on the thermal treatment of steel. Mr. Gledhill of the Armstrong, Whitworth Company criticised some of the statements made by Mr. Johns, particularly regarding the uselessness of the fluid pressure of steel. The system discovered by the late Joseph Whitworth had, he contended, in every respect justified itself. Only recently the American Gun Foundry Board had adopted fluid compression at the Bethlehem Works. M. Schneider had installed machinery to carry out the process at the Creusot Works. It had been adopted in Russia, at many works in Glasgow, and even in Sheffield, whereat there was some laughter. Mr. Carnegie, in closing the proceedings, referred to the paper as a most remarkable one.

The second day's proceedings opened with a discussion on pyrometers. During Thursday afternoon one of the rooms of the Civil Engineers' Institute was devoted to an exhibition of pyrometers, and many of them were carefully examined by the visitors. It may be remembered that at the Barrow meeting last autumn a committee was appointed to organize this exhibition, and the committee certainly amply fulfilled the terms of the reference. The report they drafted was discussed on Friday morning by such acknowledged experts as J. E. Stead, M. Le Chatelier, Professor Louis, Sir Lowthian Bell, Professor Arnold, R. A. Hadfield and others.

Mr. Hadfield in his remarks said that Great Britain was now no longer dependent on foreign countries for standardization and tests, as this work could now be done by Dr. Glazebrook at the National Physical Laboratory. It is only a few years ago that the whole of the standardization work had to be sent to Germany; now England could do her own. It was agreed that for general purposes the Le Chatelier pyrometer was the best. It was pointed out that the results obtained in taking high temperatures were sometimes misleading, quite irrespective of the pyrometer, and various methods were suggested whereby temperatures might be accurately taken. Odly enough, two works chemists who spoke disagreed as to the durability of the Le Chatelier pyrometer. One remarked that it was strong and not easily broken, and could be carried about without fear. The other observed that it was a delicate instrument, liable in many of its parts to corrosion from acid fumes, and therefore ought to be kept inclosed as much as possible.

Sir Lowthian Bell said they used the Siemens pyrometer at the Clarence Works and he had the utmost confidence in its general accuracy, while it was a very simple apparatus. But they required a great deal more than that, for they had to ascertain the temperature from the various points of the blast furnace immediately, and the pyrometer of Le Chatelier entirely fulfilled these conditions. They had wires brought into the office and they could ascertain the temperature in an instant—what the temperature of the blast was going in at and the temperature of the escaping gases issuing from the furnace. He should be sorry indeed not to have the means of registering the blast furnaces in an immediate and very simple mode. The discussion on the pyrometers waxed fast and furious, and had to be brought to a close by the chairman in the interests of succeeding papers.

Altogether the May meeting of the Iron and Steel Institute this year proved to be a most pronounced success. S. G. H.

Mexican Railway and Industrial Notes.

Importation of Japanese Labor.

DURANGO, May 12, 1904.—An attempt is about to be made to overcome the difficulty which exists in the Southern plantation districts, and in certain mining camps also, of obtaining a sufficient number of industrious and competent laborers, by importing Japanese workmen. The movement has the approval of the Japanese Government, which, notwithstanding the war between that empire and Russia, has placed no embargo upon the emigration of its subjects. Experiments have already been made with Japanese labor in a restricted way, but the testimony so far in evidence as to whether the Japanese laborer is an improvement upon the native peon, or inferior to him, seems to be of a conflicting nature. The test, however, has not yet been fairly made, and until a sufficient number of the Asiatics have been brought into the country and the experiment tried in a more extensive way, the relative merits of the two classes of labor cannot be passed upon intelligently. Should the experiment prove successful, the gain to the country will be a great one, for not only are the operations of many of the large plantation companies hampered by inability to secure a sufficient number of peons to perform the work which they have set out to do, but those who are well supplied with native labor, so far as numbers go, will be relieved of many of the vexations from which they now suffer on account of the natural failings of the peon. The well-known adaptability of the Japanese would, doubtless, soon lead to the employment of large numbers of workmen of that nationality not only in lines of work in which merely muscular strength is required, but also in other fields of labor in which technical skill and intelligence are requisite. New manufacturing enterprises are being started from time to time in Mexico, and it may reasonably be expected that in the future, when the drawback consequent upon the scarcity of fuel has been overcome, either by the development of coal lands or the discovery of petroleum in quantity, this movement of capital will increase. The movement, however, will always be retarded by the lack of labor, as well as by its inferiority, unless means are found to overcome these detriments. The Japanese Government is carefully watching this labor experiment; indeed, the terms of contract under which the Mikado's subjects are to come here have been dictated by it. Every care has been taken to guard the interests of the workers and their well being both in health and sickness. The rate of wages is to be $1.35 per day, Mexican silver, which is much higher than the average rate paid for peon labor. It is stipulated that the workmen are to be comfortably housed, and provided with bathing facilities; medical attendance and medicines are to be provided for them during sickness; they are to be exempt from taxation, and when unable to work through illness full wages must be paid for one full month, and they are to be supplied with food so long as their sickness continues. In the event of the workman's death or permanent disablement, an indemnity of $200, Mexican, is to be paid to his family. Several contracts have been made upon these conditions.

Railway Construction and Concessions.

Oscar J. Braniff has obtained a concession to construct two lines of railway, both starting from his Hacienda de Jalpa, in the State of Guanajuato, and running respectively to the city of Leon and to Salamanca. The lines are to be of standard or narrow gauge, or may be provided with a third rail for both gauges. Nine years is the term set for their completion and surveys are to be begun within six months. Ten km. must be finished within two years, and at least 15 km. yearly thereafter.

A line of tramway is to be laid down between Huichapan, Hidalgo and the station of El Cuarto, on the Mexican National Railway. The Governor of the State has subscribed $12,500 toward the expense of construction and equipment.

Notwithstanding frequent denial of the report that the Government intended to purchase the Vera Cruz & Pacific Railway system, the sale of that property to the federal authority may be regarded as an accomplished fact. Representatives of the receiver of the Maryland Trust Company are now in the capital for the purpose of making the transfer. The Vera Cruz & Pacific Railway is a tropical road running from Cordoba, in the State of Vera Cruz, to a junction with the National Tehuantepec Railway at Santa Lucrecia, and having a branch from the city of Vera Cruz to Tierra Blanca on the main line.

The Monterey Coal Company, an affiliation of the Monterey Iron & Steel Company, have been granted a concession to construct two lines of railway, starting from their coal mines, Del Menor, in the State of Coahuila, and running respectively to a connection with the International Railway and to the town of Muzquiz. The roads are to be of standard gauge.

Industrial Notes.

It would appear that the company, who about a year ago obtained a concession to establish a Bessemer steel works at Tepeyahualco, Puebla, have decided not to carry out their plans. An item published in a local journal states that the Government has agreed to release the Compañia Altos Hornos Mexicanos, S. A., from the obligations and liabilities emanating from the concession of January 24, 1903, granted to Emilio Segura, for the establishment of a steel foundry on the Bessemer system, and by him transferred to the company. The deposit of $5000 in bonds of the 3 per cent. consolidated silver debt deposited by the company in the National Bank of Mexico has been returned to the depositors.

A movement is on foot, supported by the Canadian and Mexican Governments, for the establishment and maintenance of a steamship line between Canadian and Mexican ports. The Government of Canada has voted a subsidy of $50,000, gold, for the service. The Department of Communications of the Mexican Government has now recommended that a subsidy of $120,000 annually be paid for the support of the proposed line. It is believed that in the event of this steamship service being established trade between Mexico and Canada will be considerably increased; indeed, representatives of Canadian manufacturing concerns have already been here looking for orders, delivery being contingent upon the realization of this hope of cheaper transportation facilities.

The rates of exchange during the past month or two have been very irregular, the fluctuations ranging from 215 to 230 per cent. The rate adopted by the Treasury Department for the payment of import duties during May is 224.05 per cent.

Statistics covering the import and export trade for the first seven months of the current fiscal year show that the total gold value of the merchandise brought into Mexico during that time was $43,719,344.68, and the silver value of the exports $123,404,549.16. Among the items making the total of the imports were machinery and apparatus, $5,785,316.43; vehicles, $1,141,341.76, and arms and explosives, $1,224,071.24

Among recent imports from the United States were 4000 tons of steel rails, 229 tons of steel wire and 142 tons of pipe.

The firm of Van Voorhis & Sanford of Monterey have been appointed agents for that district by the Heine Safety Boiler Company of St. Louis, Mo.

The Governor of the Territory of Tepic, General Pablo Rocha y Portee, is prepared to receive bids for the construction and equipment of an electric light plant for the lighting of the city of Tepic. The city of Colima, in the State of that name, is also to be lighted by electricity. A company with a capital of $125,000 have just been formed who purpose erecting a power plant near the waterfall in the hacienda de San Antonio, of which the owner is Arnold Vogel.

Among the plantations whose owners have decided to install sugar making machinery are the Motzorongo, Vera Cruz, whose headquarters are in Chicago, and the San Miguel, near Chimameca, in the same State.

Tomás Fermin and Tomás Agruel of Ensanada have obtained permission to bore for petroleum in the district of Mulege, Lower California.

Arthur Frantzen & Co., electrical engineers, of Chi-

cago, have opened branch offices in the City of Mexico, with A. B. Boynton in charge. J. J. D.

The Kepp Metallurgical Furnace.

In the making of many kinds of castings, but notably those for gears, it is generally necessary to use an alloy of metals whose combination gives certain desirable characteristics of strength, elasticity and ductility which are not found in one metal alone. Not only is it important to get the right ingredients in the alloy, but the metals must be mixed at the proper temperatures. Invariably one or another of the components melts at a much lower temperature than the others, making it difficult to mix them without damaging the more fusible components. The furnace which is described herewith has been designed for melting and mixing metals having unequal melting points to produce an alloy under the best conditions, and to do it in an economical way with reference both to fuel and labor. It is the invention of Ferdinand Kepp of Brooklyn, N. Y., and is the subject of a patent recently granted.

The manufacture of brass was the purpose especially in mind in the design of the furnace, but it is capable of other metallurgical uses. Brass, being an alloy of copper and zinc, is usually attended in its making with objectionable oxidation of the zinc and sometimes actual vaporization, as its melting point is many degrees below that of copper. In this furnace any considerable oxidation or vaporization of the less refractory metals is prevented by separately heating such components initially. The base metal is first melted, and the other metals are brought nearly to their melting points before they are introduced into the molten basic metal. To obtain these conditions it is necessary to regulate the blast on the furnace so as to properly control the combustion. The manner in which this is done will be hereafter explained. Another object of the invention was to secure a maximum output by providing for the concentration of heat at the most effective point. This is obtained by the peculiar construction of the melting chambers, such that the flame is first projected against the body of molten metal and subsequently against the last introduced pigs, these being supported on the hearth table between the crucible and the stack. The construction also provides a convenient means of dropping the initially heated metals into the basic metal at the proper time. They strike the surface of the lower metal bath at the point where the flame impinges, so that the precipitated metals are instantly melted.

Fig. 1 shows a longitudinal vertical section of one-half the furnace, the other half being similar and symmetrical. Fig. 2 is a horizontal section on the line of 2 2, Fig. 1, and Fig. 3 is a similar section on the line 3 3 of Fig. 1. The principal features of the furnace are a melting chamber, A, and two initial heating chambers, B B^1, located above the melting chamber, where separate heating is provided for different metals, such as zinc and brass scrap. Each of the chambers is in direct communication through constricted throats, *a*, *b*, *b'*, with the chimney or discharge flue C leading to the stack D. At the front of each chamber are separate fire boxes, E, F and

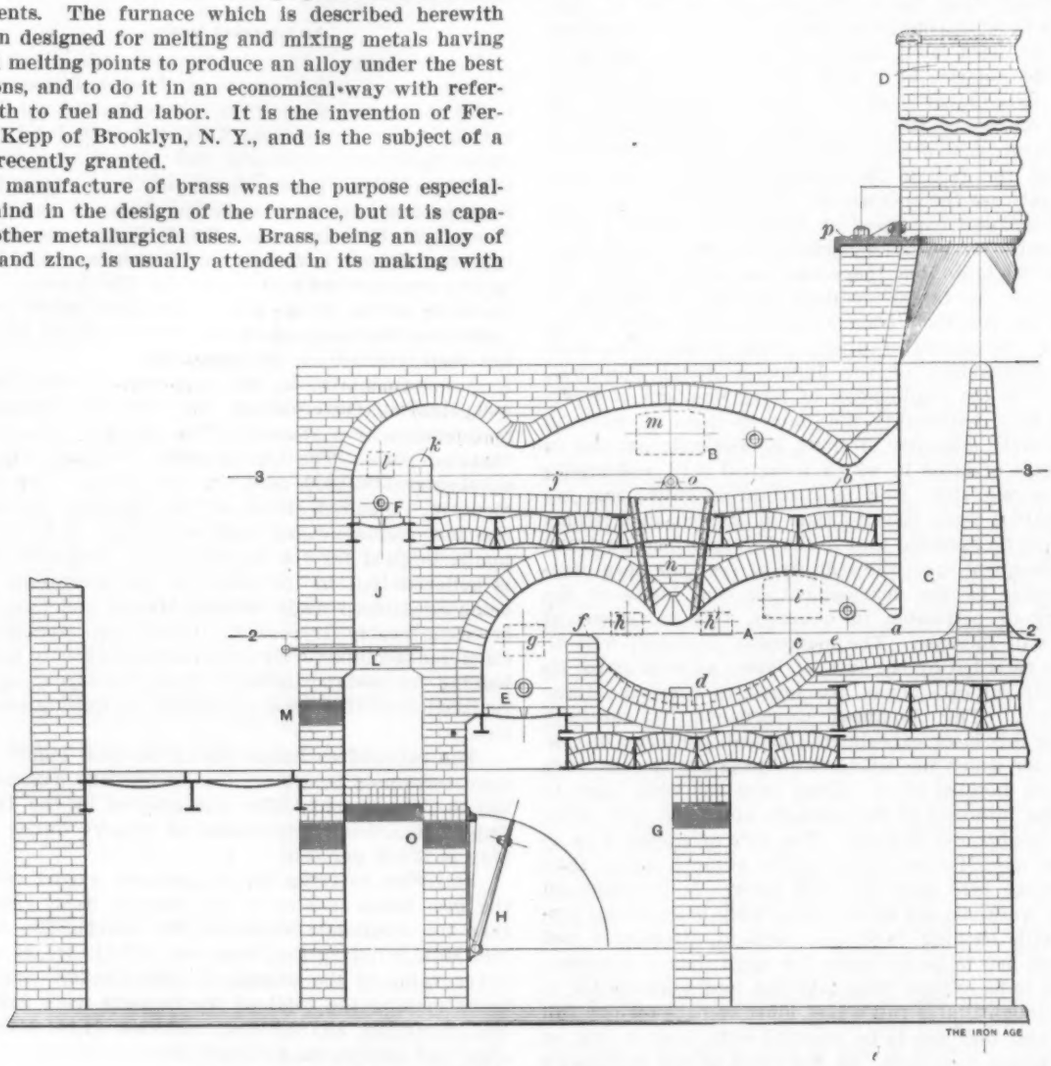


Fig. 1.—Longitudinal Vertical Section of One-Half of the Kepp Furnace.

F^1, equipped for the use of wood, coal or oil, as the case may be.

Below the melting chamber A is an air chamber or diving flue, G, communicating at one end with the fire box E of the melting chamber A, and having an opening covered by a swinging door or valve, H, which controls the air admitted to the chamber. The latter contains sufficient air to maintain combustion in the fire box E. Similarly vertical air flues, J and J^1 (see Fig. 3) are located below the fire boxes F and F^1 of the initial heating chambers. The flues J J^1 are identical in construction, and each communicates with the outer air through passages M and M^1, controlled by valves, and with the chamber G through passages O and O^1, controlled by valves.

The hearth *c* of the lower heating chamber is constructed of silica brick. It includes the crucible *d* and the inclined table *e* and extends from the bridge wall *f* to the rear wall of the discharge flue. The hearth rests on a brick foundation supported by arches carried by transverse I-beams. The roof of this melting chamber is formed by two intersecting arches which extend from

the front of the fire box to the flue. The groin or intersection of the arches is just in front of the center of the crucible. The bridge wall *f* rises above the crucible, a little to the rear of the crown of the left hand arch, and almost reaches the horizontal plane of the groin of the intersecting arches. The crown of the second arch is approximately over the intersection of the crucible *d* and the hearth table *e*. It will be noticed that the form of the top and bottom walls of this melting chamber gives the burning gases a circuitous path. The flames from the fire box rise considerably above the crucible in order to pass over the bridge wall and are then deflected downward, which causes them to impinge upon the surface of the molten metal in the crucible at a point directly under the groin of the roof. The flames next rise in the second arch and escape through the constricted throat *a*, after being projected against the solid metal placed on the table *e* of the hearth. Thus the heat is concentrated at the most effective points. As the metal on the inclined table melts it runs down into the crucible, where it comes in the path of the hottest flames.

One side wall of this chamber contains a fuel opening, *g*, where the wood or coal is introduced; pole openings *h* and *h'*, through which the bath may be observed and the necessary poling of the metal may be done, and the charge opening *i*, through which the metal may be placed upon the hearth table. The chambers B B¹ are identical in construction, each being provided with silica brick hearths, *j j'*, extending from the bridge walls *k k'* to the flue C. The hearths incline downward to a point directly over the groin of the melting chamber roof, and are supported upon foundations consisting of arches and I-beams supported above the arched roof of the chamber A. The roof of each of the initial chambers, like the roof of the melting chamber, consists of intersecting arches but of different radii. The crown of the long arch is directly over the lowest point of the hearth. This for the reason that there is no need for securing the intense concentration of heat in the initial chambers which is required in the melting chamber, since the metal is not actually melted. In the side walls are fuel openings, *l l'*, and charge openings, *m m'*.

In the manufacture of brass, copper is placed on the hearth table in the lower chamber, and is melted to form a copper bath in the crucible. Into this bath the other metals, such as zinc and brass, raised approximately to their respective melting points, are precipitated from the initial heating chambers through tapering shafts *n n'* extending from the lowest points of the hearths *j j'* and piercing the roof of the melting chamber at the groin. The taper form of these shafts prevents the too rapid precipitation of the metal into the copper bath. It will be noticed that the previously heated metal is introduced into the melting chamber at a point where the heat is concentrated by the form of the melting chamber roof, and consequently the metal is instantly melted and incorporated in the bath with the least ozidation and vaporization.

The upper ends of the shafts *n n'* are closed by caps or doors *o o'*, which are removed at the proper time to permit the initially heated metals to flow into the bath. The top of the chimney is protected by a cap plate, *p*, secured by bolts, and supports the stack D, which may be lined with fire brick, as shown.

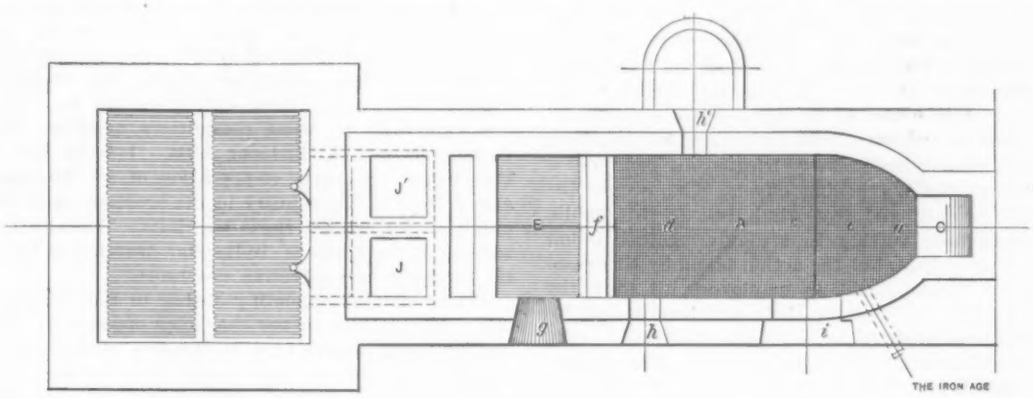


Fig. 2.—Horizontal Section on the Line 2 2 of Fig. 1 through the Melting Chamber.

While the fire boxes are provided with grates resting on I-beams for the burning of wood or coal, they may also be augmented by oil burners, Q, for the use of liquid fuel. In the latter case, if desired, the grates may be removed.

In starting the furnace the various valves controlling the circulation of air are adjusted and the fires lighted. The initial heating chambers are charged with zinc and brass scrap and the melting chamber is charged with copper. The free circulation of air through the diving flue G will promote sufficient combustion to melt the copper quickly, causing it to run down into the crucible to form a bath, the temperature of the zinc and brass in the meantime having been raised approximately to their melting points by different degrees of heat in the chambers B B¹. The cap *o'* in the chamber B¹ is first removed, and the brass dropped through the shaft *n'* into the copper bath, and after a brief interval, to permit the complete melting of the brass and its union with the copper, the cap *o* in the chamber B is removed and the zinc precipitated into the bath. Both caps, *o* and *o'*, are then replacel, the various valves closed to exclude air except such as is contained in the chamber G, and the combustion in the fire box E is increased as much as possible to secure intense heat in the melting chamber. The molten metal is poled and skimmed, and the metal is tapped out of the crucible in the usual manner.

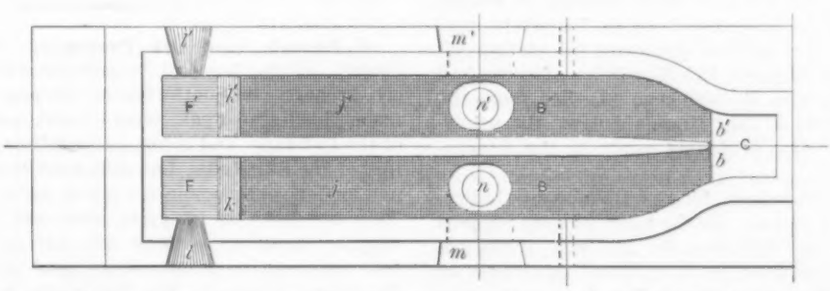


Fig. 3.—Horizontal Section on the Line 3 3 of Fig. 1 through the Initial Heating Chambers.

Reid Kennedy of Homestead, Pa., has been appointed secretary and treasurer of the Orient Coke Company, Pittsburgh, succeeding C. J. Morse, resigned.

Address of D. M. Parry.*

The Bright Side of the Labor Question.

I have spoken of the heavy losses inflicted upon the nation during the last year because of the strife engendered and carried on by organized labor. This is the dark side of the picture, and now I will speak of the bright side. The net results of the year's campaign have been decidedly in the direction of a better understanding between employer and employee as to the rights of each. The cause of industrial peace founded upon individual freedom has constantly gained ground, and the tendency toward socialism or semisocialism has received a telling blow.

At the time of the Indianapolis convention of this association I remember that many of us regarded it as a foregone conclusion that the eight-hour bill would be passed by Congress, and at the New Orleans convention last year the general voice of the country seemed to uphold organized labor even in its more extreme positions.

The protest against socialistic and lawless unionism made by this association at New Orleans last year had a very salutary and far-reaching effect. The people listened to this protest, and from that time to this public sentiment has been setting in strongly against union methods. Not only that, but the action taken by this association gave encouragement to employers all over the country. Organization became their watchword, and today we find associations of employers in practically every large city and in scores of smaller ones. In this general work of organization this association, I am glad to say, has done its part.

With the more thorough organization of employers and more extensive propaganda work the cause of industrial freedom has made sure and lasting progress. Strike after strike has been lost by the unions, and though the militia was called out in some places and anarchy seemed to prevail for a time in others, yet the supremacy of the law has been better upheld than in previous years. There have been such things as indictments returned by grand juries against strikers for assaults, and fines have actually been levied against others. A number of suits are pending in different parts of the country for personal and property damages against strikers, and there have been some notable court decisions in regard to the boycott. The contest has been waged extensively all along the line. In Congress the labor lobby has not succeeded in getting its bills out of the hands of the committees, while the civil service regulations have been upheld by the President as against the closed shop law of organized labor. The year has been crowded with notable events in regard to the labor question, but none was so important perhaps as the order of President Roosevelt reinstating W. A. Miller in the Government Printing Office after he had been discharged because he had been expelled from the union. The President at that time laid down the principle that the closed shop could not apply in the Government service.

The change in the general tone of the press is indicative of the trend of events. In the place of open support of the unions we now find that the majority of the papers handle the labor question with exceeding caution as though it were a two-edged sword. But it is with great pleasure I am able to state that a number of the leading journals of the country have come out boldly against the presumptuous acts of unionism. These newspapers have rendered an inestimable service, and they should receive our fullest support. A decided change in the attitude of public men is also to be noted. Feeling the pulse of the people, they are coming to realize that the voting power of the unions is not the whole voting power of the nation. At last the business elements and the good citizenship of the country are coming to the support of the men in public life. The majority of those in official positions are not at heart desirous of being subject to the dictation of labor bosses, and at any rate they should have that support back of them that will enable them to feel free to perform their duty without fearing the threats of organized labor.

Legislation at Washington.

Pending legislation inimical to industrial interests made very little progress toward passage at the recent session of Congress. The bills against which our objections were centered were the Anti-Injunction bill, which proposes to strip the Federal courts of the power to issue legal process for the protection of property and constitutional rights in times of labor disturbance; the Eight-Hour bill, which proposes interference by the Government with the right of men to work as many hours as they please, and which would cause the public funds to be used for the payment of higher prices for contract work than private corporations would have to pay; and the National Arbitration bill, which proposes to establish a national tribunal of arbitration and inquisition into the affairs of private industry. The bill providing for the introduction of the metric system in this country has also received a large amount of attention by this association.

Many hearings were given during the session by the Congressional committees having charge of these bills, and especially by those committees handling the Anti-Injunction and Eight-Hour bills. I have here to acknowledge the hearty co-operation of all the employers' associations of the country in the prosecution of the campaign waged against these two bills. The allied organizations of the Citizens' Industrial Association in particular rendered very effective assistance.

The policy of appealing openly to the intelligence of the public on bills of the character opposed by this association has I believe been thoroughly vindicated. In opposing these bills we have really been fighting socialism, and in order to check the introduction of such measures and to lessen the danger of their enactment it is of the first importance to arouse public sentiment against them.

Reciprocity and Foreign Commerce.

The subject of reciprocity, in which this association has always had a deep interest, appears for the time being to be attracting comparatively little attention by the country. There are many indications, however, that there will be a strong revival of agitation of the matter in the not distant future. In this connection I wish to call the attention of the association to the fact that the Executive Committee has appointed a subcommittee to take up this subject. This action I believe is a very important one, and will produce excellent results. It is in line with wisdom and prudence that a subject so broad and complex as that of reciprocity should be carefully considered by a committee, and the efforts of the gentlemen on this committee, I hope, will receive the active assistance of the entire membership.

* President of National Association of Manufacturers. Abstract of address delivered at the Pittsburgh meeting, May 17, 1904.

A Nevada Iron Ore Property.—Alfred Merritt of Duluth, Minn., has just bought for $30,000 a large iron ore property in Southwestern Nevada. It lies not far from Charleston Peak, west of and near the great bend of the Colorado, and is but a short distance from the main line of the Salt Lake, Los Angeles & San Pedro Railroad, now under construction from Salt Lake City to the coast. This ore body is of great size and high grade. Mr. Merritt states that there are not far from 10,000,000 tons that can be measured up, and that the average of the many assays he has had made is not far from 63 per cent. iron and 0.030 per cent. phosphorus, without an undue proportion of other deleterious elements. This seems to be a great mountain of ore, but so far as present prospecting is evidence there is no more ore in the vicinity. It is about 250 miles from the coast and will have direct connection with San Pedro Harbor, which the Government is now improving at a cost of about $4,000,000. It is far from fuel, and in this respect is not so advantageously located as the Southern Utah deposits, but it is only half as far from the Pacific. Mr. Merritt proposes to hold this property indefinitely.

The Carborundum Exhibit at St. Louis.—The Carborundum Company, Niagara Falls, N. Y., recently shipped two freight cars loaded with products to be displayed at the St. Louis Exposition. One of the principal features will be a great pyramid of carborundum crystals

7 feet high and 6 feet in diameter at the base. The crystals are of the most beautiful shapes and colors, and will produce a dazzling effect when properly lighted. The balance of the exhibit will be made up of carborundum wheels, sharpening stones and other products; also samples of different work that has been made possible by the use of carborundum. The display will be in charge of William H. Arison, who had charge of the carborundum exhibit at Buffalo, and E. W. Taylor, who was in charge of the Charleston, S. C., display.

Lake Iron Ore Matters.

Some Lake Ore Ships Moving.

DULUTH, MINN., May 16, 1904.—A few lake ore ships are moving, but the trouble between the Lake Carriers' Association and the Masters' and Pilots' Association is not settled and shows no signs of early agreement. There is a feeling among many that the carriers are not at all anxious for an early settlement, for it is a recognized fact that vessels will make more money in a four months' season than in seven months, providing they can carry all freight offered in the shorter period, and that they can do it this year there is not the slightest question. The first ship to arrive on Lake Superior for ore came into Duluth Saturday, and loaded at the Great Northern docks.

Mines continue to work slowly, and some to close. Among the latter have been several the past few days. One of these is Beaufort, at Michigamme, Marquette range. It produces limonite ore that averages 52 per cent. iron and about 0.257 phosphorus. Such an ore is not of especial value this year. Beaufort has been extensively opened the past two years and is in position to make a large output when needed. It is owned by the Bristol Mining Company, of which Oglebay, Norton & Co. are head. Another is Susequehanna, at Hibbing, Minn., belonging to the Buffalo & Susquehanna Iron Company. It had sunk two shafts the past winter and is quite well opened underground in preparation for a large production. Its ore is a soft hematite about on the Bessemer limit. A third is Crosby, of the Cleveland Cliffs Iron Company, a West Mesaba mine, that was under development and was to have made small shipments this year. Pumps have been taken out and nothing will be done this year. Of the 30 mines located close to Hibbing, Mesaba range, only about half are likely to be operated this year, among these being nine or ten belonging to the Oliver Iron Mining Company.

The Drake & Stratton Company, contractors, have just taken a contract for the removal of 500,000 yards additional earth from Stevenson mine, making 700,000 yards to be moved under their direction. This will probably complete the stripping at this mine. This firm have contracts on hand now for the removal of about 1,750,000 yards this year, which is an exceptionally good amount for the times, and compares quite well with the 2,500,000 yards of last year. Most of the stripping contracts under way have been much curtailed for this year The Drake & Stratton Company have now nine steam shovels and about 1000 men working on their Mesaba contracts.

Iron ore men of Minnesota have been holding meetings the past few days to estimate their probable shipments of the year and to give the county authorities a basis upon which to arrange the tax valuation on the probable amount of ore to be moved. Their figures show a very decided decrease from last year. A few examples are Mahoning, last year 1,000,000 tons, this year probably about 700,000 tons; Biwabik, last year 800,000 tons, this year probably about 500,000 tons; others are in proportion or even less.

The New Monroe Mine.

The busiest place on the Lake Superior ranges now is at new Monroe mine of the Oliver Iron Mining Company, in section 28-58-20. Here three shafts have been going down all winter, along an east and west line of about 2000 feet. Shaft A, the most easterly, is down 170 feet and is some 60 feet in the ore; shaft B is down 90 feet and is still in surface; shaft C is down about 160 feet and is 30 feet in ore. The three are some 2000 feet north of the south line of the mine and 1500 feet south of the north line. A large stripping contract is under way by the Killorin-Philbin Company, and of the 2,000,000 yards to be moved in this great undertaking about 160,000 yards have been taken off since work started late last fall. The stripping will be the deepest on the Mesaba, ranging from 80 to 100 feet, and there is every probability that before the mine is worked very long stripping to the depth of 120 to 125 feet will be undertaken. There must be, of course, a great depth of ore beneath to warrant this stripping, and there is, for Monroe is one of the Steel Corporation's largest mines and has an enormous tonnage in sight. This tonnage has been recently increased very greatly by deeper drilling, many of the holes having been redrilled, as much ore has been found under 100 or more feet thickness of taconite lying under the main ore body, and none of this deeper stratum of ore was known when the mine passed from the Chemung Iron Company, its former owners, into the possession of the Steel Corporation. A stripped area of perhaps 15 to 18 acres is being planned for the ground immediately south of the shafts. The mine will be equipped with electric haulage underground, and ore will be drawn from the southern limits beneath the stripped area to the shafts. The bulk of mining will be, of course, from underground.

It is not possible that this mine can produce any tonnage this year, and it may not mine very much in 1905, but it will be, when fully developed, one of the very important assets of the United States Steel Corporation in the Lake Superior region and as such deserves more than passing notice. The mining officials of the corporation are opening this mine with a full realization of its great future, and they will be able to mine its giant reserves at exceptionally low costs. At the same company's Howard mine, being developed a few miles from the Monroe, they have a shaft 130 feet deep and in ore. This mine will not be much of a producer this year, but it also has an important future.

A Notable Power Plant.

The Cleveland Cliffs Iron Company have about ready for operation at their Lake mine, Ishpeming, a new power plant that is exceptionally well planned and strikingly built. The plant is housed in brick buildings with steel roofs, supported, in the case of the boiler room, by steel columns. The steam plant consists of five 72-inch by 18-foot horizontal boilers, arranged for a pressure of 150 pounds. The coal bins are swung from the roof trusses, and the feed is by gravity to Murphy automatic stokers. A tram car, running in an ash tunnel underneath the pits, will handle ashes with little labor and no delay. The stack is the second in size in the Lake Superior region, being 166 feet high and 6.5 feet inside diameter, built of radial brick. In the engine room are two hoisting drums each of 7-foot diameter and 4-foot face. They are driven by a pair of 20 x 32 inch Corliss engines, with steam operated spiral reversing gear, a feature that is becoming quite popular in the lake country. The drums are fitted with steam operated brake and clutches. The compressor has a steam end 22 x 45, cross compound Corliss type, with the air end 23 and 37 inches diameter, with 48-inch stroke, with spray intercooler. There is an electric plant for tramming, put in by the General Electric Company; an 8-ton crane covering the entire engine house, and other modern appliances.

Copper Notes.

In the Lake Superior copper district the new steam mill at Baltic mine, near Houghton, has just given some record breaking results, one of the stamps having just achieved the feat of stamping 728 tons of rock in 24 hours. This rock is a hard amygdaloid, and a tonnage of about 500 to 550 per day has been considered the top notch. The three heads at this mill in one week averaged a daily produce of 699 tons, and this is also a record. The fear that such stamping results would be at the cost of richer tailings was not justified by results at the Baltic. Sixty years ago stamps in copper country mills handled about 5 tons of rock daily. Average current milling costs in the district are from 18 to 22 cents per ton of rock treated.

Production of refined copper by mines of the Lake

Superior region was last year, by official reports now published by the various companies, 192,405,466 pounds. This is an increase of 19,785,496 pounds over 1902, of 36,786,618 over 1901, and of 50,354,460 over 1900. The product of the various mines for the year was as follows:

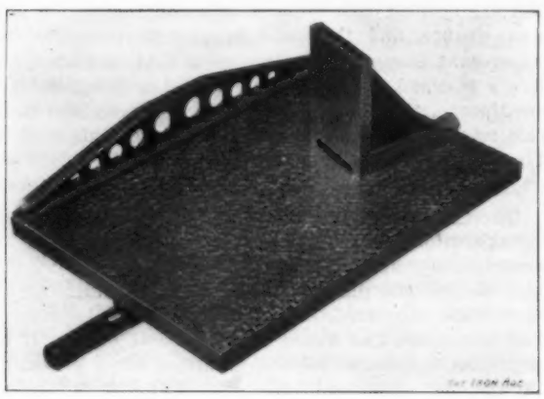
Mine.	Pounds. 1903.	Mine.	Pounds. 1903.
Calumet & Hecla	76,490,869	Isle Royale	3,134,601
Copper Range Con.	30,382,195	Mass. Con.	2,576,447
Quincy	18,498,288	Adventure	2,182,668
Osceola	16,059,636	Winona	1,036,944
Tamarack	15,286,093	Michigan	275,078
Wolverine	8,999,318	Phœnix	202,823
Mohawk	6,284,327	Arcadian	150,000
Atlantic	5,505,598	Rhode Island	31,611
Franklin	5,309,030		
		Total	192,405,466

D. E. W.

The Hazelton & Donald Surface Testing Outfit.

Although the manufacture of surface plates is not by any means a new art, there are, however, certain principles embodied in the testing outfit recently designed by the Hazelton & Donald Machine Company, Philadelphia, Pa., which give new interest to the subject. These affect both the proportions and suspension of the surface plates, whereby their permanent accuracy is guaranteed under all conditions and strains.

A common arrangement of surface plate construction at the present time makes use of open or broken ribbing in combination with a three-point support. It will



THE HAZELTON & DONALD SURFACE TESTING OUTFIT.

be appreciated that in a construction of this kind there must be at least two parts of a square plate which overhang the third, or single support, resulting in the sagging of such parts and eventually producing an error in the plate. Again, when such a surface plate has been scraped in its ordinary position of suspension, if it becomes necessary to turn the plate over to use it as a rubbing plate the condition of perfect flatness is in danger of being destroyed. This is avoided in the Hazelton & Donald surface plate by making the ribbing of deep closed rectangular form and so proportioning it that whether the plate is used top or bottom side up accuracy is maintained. Also, by the system of suspension, whether the plate is at rest, in use or idle, the ordinary condition of accuracy remains unchanged, regardless of the weight placed upon it.

With this new suspension the surface plate proper rests upon five points distributed in suitable positions to insure the most equal support to the whole mass. Two of the corner supports rest upon two like solid points of a frame which is constructed as a three-point support. The two opposite corners rest upon the arms of a lever, which, in turn, rests upon a fulcrum located at a distance from the center of the plate such as to insure the equilibrium of the surface plate, whether it is loaded with the piece to be tested or is simply supporting its own weight. This second arm lever performs a double function: it furnishes a compensating support for the center of the plate under all conditions of load, and also by its peculiar construction renders it impossible to produce torsion or twist in the surface plate, no matter what the weight or where applied.

These plates are guaranteed to be scraped to a degree of perfection that shall fulfill the most exacting tests. With the plate is furnished a straight edge, scraped and tested to the same degree of accuracy; a knee or angle plate, scraped to absolutely 90 degrees in all positions, and four setting-up blocks, to be used where it is desired to set the pieces for testing clear of the surface plate. Two knurled grips are also provided with the surface plate, to facilitate handling when it is used as a rubbing or testing plate on milling machine standards or other light surface work. For general use on the bench, a hardwood case is supplied, which forms an inclosure for the surface plate. The complete testing set is intended as a comprehensive outfit for all kinds of jig or toolroom work.

The Henry W. Oliver Estate.

An appraisement of the personal estate of the late Henry W. Oliver has been filed in the Register's office at Pittsburgh. The personal estate alone is estimated by Andrew W. Mellon and George E. Tener to be worth $16,246,327. The present worth of the securities owned is fixed in the appraisement, which is as follows:

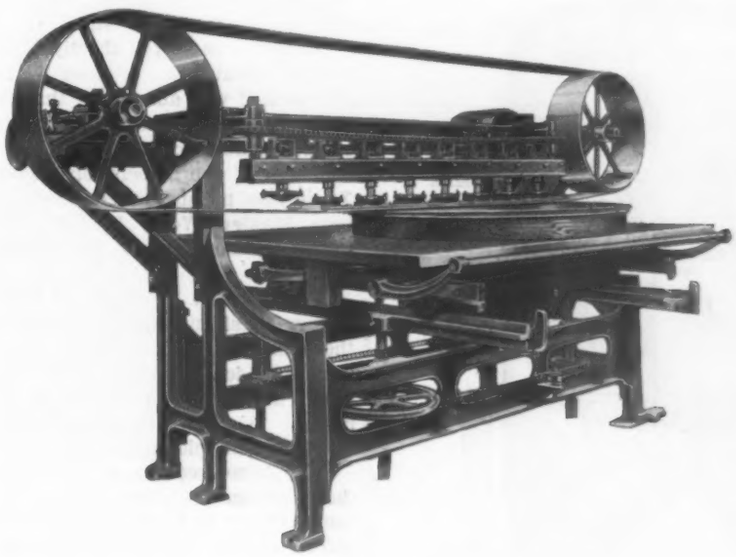
Oliver Iron & Steel Company stocks	$5,448,500.00
Pittsburgh Coal Company	1,257,250.00
Pittsburgh Coal Company, preferred	642,500.00
Calumet & Arizona Mining Company stocks	1,187,820.00
Calumet & Pittsburgh Mining Company stocks	213,740.00
Lake Superior & Pittsburgh Development Company stock	30,000.00
Pittsburgh & Duluth Development Company stock	46,500.00
Junction Development Company stock	4,000.00
United States Steel Corporation, preferred stock	16,500.00
New York Shipbuilding Company stock	137,500.00
Harvey Iron Company stock	275,000.00
Neeb-Hirsch Publishing Company, common stock	64,000.00
Westinghouse Air Brake Company stock	6,500.00
Standard Car Company stock	58,300.00
Pittsburgh & Lake Erie Railroad Company stock	12,100.00
El Cobre Mine stock	15,000.00
Great Lakes Canal Company stock	61,875.00
New York & Canada Copper Company stock (present value unknown)	1.00
Great Lakes Towing Company stock, preferred	9,675.00
Great Lakes Towing Company stock, common	375.00
Detroit Iron & Steel Company, preferred stock	42,000.00
Standard Chain Company, preferred stock	29,295.00
Standard Chain Company, common stock	10,944.00
Standard Chain Company, bonds	26,100.00
Allegheny County Club bonds	5,000.00
Interest in Chemung Iron Ore leases	4,000,000.00
Interest in United Development Company (present value unknown)	1.00
Interest in Briggs-Oliver Exploration Company (present value unknown)	1.00
Cash in banks	641,777.01
Due from city of Pittsburgh	303,509.61
Mortgage from S. F. Nirdlinger	600,000.00
Pittsburgh Coal Company, dividend scrip	30,563,75
Notes of Chemung Iron Company	700,000.00
Note, Pittsburgh *Commercial Gazette*	760,000.00
Notes of various solvent persons	95,000.00
Private car	15,000.00
Total	$16,246,327.37

The bi-monthly wage scale fixing wages in bar iron mills in the West that sign the Amalgamated scale was arranged in Cleveland last week at a conference between officials of the Amalgamated Association and James H. Nutt of the labor bureau of the Republic Iron & Steel Company. These settlements are usually made in Youngstown, but owing to the fact that the Amalgamated Association was in session in Cleveland, it was arranged this time in the latter city. It was found that the average selling price of comon iron bars for March and April did not warrant any change in the puddling and finishing rates for May and June. The present rate for boling is $5.25 a ton based on a 1.3 cent card rate.

The South Pittsburgh Iron Works, Claysville, Pa., manufacturers of general foundry work, structural steel work and special steel water towers, have opened an office in the Empire Building, Pittsburgh. It will be in charge of Theodore J. Vollkommer, who is connected with the firm of Vollkommer & Schenke, contracting agents.

The Clemons Belt Sander.

A recent invention in the way of a sanding machine is that shown in the accompanying illustration, known as the Clemons belt sanding machine. It is the invention of D. L. T. Clemons of Hornellsville, N. Y., and is manufactured by the Clemons Machine Company of the same city. It is designed to do away with hand sanding, and is said to perform the work better and much more quickly. The working feature is a sand belt running continuously in one direction at the rate of 3300 feet per minute. Due to its high velocity it carries the dust with it, leaving the pores of the wood perfectly clean, as is shown when the sanded surface is examined under a magnifying glass. This effect is not obtained on machines using a reciprocating motion, as with them the dust is worked down into the pores of the wood, a fact which explains why the average filler fails to give satisfaction. Owing to the construction and adjustments of the automatic flexible spring pad, the machine is capable of sanding veneered surfaces as perfectly as solid wood, making it of value in the manufacture of high grade furniture. The machine has a record of sanding 500 average sized table tops in ten hours' time, each being passed through the machine twice, once with a coarse and once with a fine sandpaper belt.



THE CLEMONS BELT SANDER.

A valuable feature of the machine is its ability to sand any shaped table top, either round, oval, clover leaf or any other fancy shape. The belts are 23 feet long and 8 inches wide, and are made of Ruby combination sand cloth and paper manufactured by Herman Behr & Co., New York. This combination gives splendid service and is long lived. The belts can be changed in three minutes' time, and may be tightened by an adjustable screw, having a quick release. To accommodate different thicknesses of work the entire table can be raised or lowered.

The work table upon which the work is placed moves backward and forward transversely under the sand belt. The automatic flexible spring pad under which the belt runs is supported by adjustable springs, and is arranged with a rocking side motion, which allows it to adapt itself to any unevenness or warp in the surface. The machine is supplied with pads of different length for various kinds of work, which can be changed as quickly as the machine can be stopped, one pad slipped off and another pad slipped on. While the work is being fed forward or backward by rolling the table on its tracks, any degree of pressure may be applied to the belt by depressing the operating bar. The table is counterweighted so that it is accurately poised.

The machine is made in two regular sizes, one to sand surfaces 5½ x 4½ feet, and one to sand surfaces 8 x 4½ feet. It weighs 2400 pounds, occupies a floor space of 10 x 12 feet, and is normally operated at a speed of 550 revolutions per minute of the driving pulley.

The Nashua Machinists' Strike.

Joseph Flather, president and treasurer of Flather & Co., Incorporated, Nashua, N. H., has issued a statement to the press of this city, which states the case of the strike of machinists employed by his company and clearly defines the company's position. The strike is a result of the attempt to unionize the shops of Flather & Co., Incorporated, and the Mark Flather Planer Company. Mr. Flather, after reviewing the history of his business since it was established in Nashua 36 years ago, during which time there have been only two occasions when the company were out of work, in 1873 and 1893, says:

> Our policy has been to deal directly with each individual workman, and we have heard, and will still hear, any complaint they wish to make as individuals. Commencing more than two years ago, when we had 130 men at work, business has fallen off considerably until last July, and from then very rapidly, necessitating our reducing our help accordingly, so that on October 1, 1903, we had in our employ only 80 men. Of that number 27 have gone, of whom 13 were union, 13 nonunion, and one we do not know about. On May 5, the day before the strike, we had 53 men at work, 34 nonunion, 12 union, and 7 about whom we had no information, as they were apprentices. Kindly note that we had within one as many union men at work as had been discharged. No one has been hired who had not previously been laid off for want of work. We could not have put additional men at work without discharging some men at work, and this we would not do. We have had opportunities to hire help from other cities, but our copy book will show that we refused to give them employment.

Mr. Flather then tells of his advice to workmen who wished to take long vacations last summer, that they should work constantly as long as there was the opportunity, and the refusal of some of them to take the advice. He tells of the efforts of the company to secure additional business since the depression began and of the necessity of discharging men, which necessity the company shared with the machine tool manufacturers generally. He continues:

> In doing this we acted within our own rights, which rights, we hold, are undeniably our own, and we will not countenance any interference by committees or delegates from any labor union or any organization of any description. We hold to our right to hire such workmen as we choose, at such wages as are mutually satisfactory between them and ourselves, and that we may, without holding ourselves accountable to any one, discharge them at any time that we may see fit, after giving them a fair notice. On the other hand, any employee has a perfect right to leave our employ, after giving us a fair notice, at any time he sees fit. We will not enter into any agreement to take back any workman, now or in the future, who has been discharged by us, or who is at present out on strike, but shall use our discretion in hiring such help as we choose on terms mutually satisfactory.

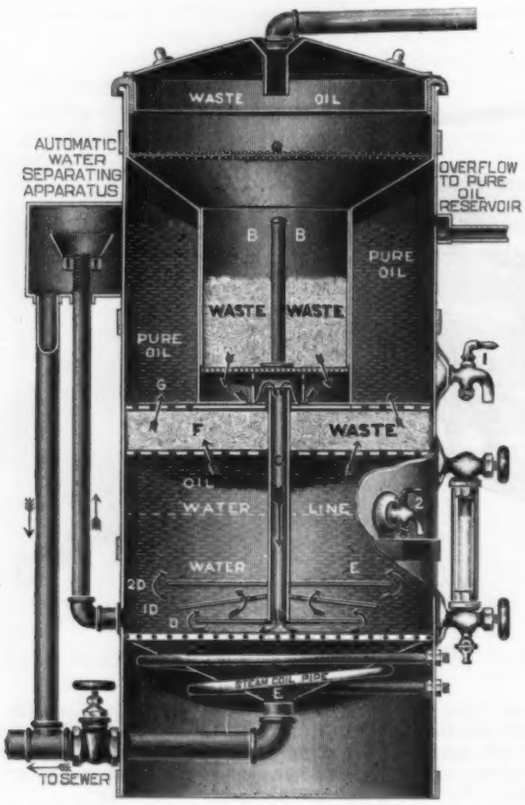
Neither Flather & Co., Incorporated, nor the Mark Flather Planer Company are crippled by the strike. The machinists could not have chosen a better time for the manufacturers. At Flather & Co.'s shops the fitters did not strike, so that the erecting is going on without inter-

ruption. Of the machinists at work when the strike was called, only 12 journeymen went out. A sufficient force is on hand to take care of present business, and when it becomes necessary to take on additional men little trouble is anticipated in procuring them, even if the strike is not ended at that time.

The Cross Style "B" Oil Filter.

The Burt Mfg. Company, Akron, Ohio, are the manufacturers of the oil filter shown in the accompanying sectional view. This filter is designed to receive the condensation from oil separators or exhaust heads and to automatically separate the oil from the water, while at the same time purifying it. The water is drained to the sewer, and the pure oil, rising into a separate chamber, overflows into the pure oil reservoir. The filter is made in 12 different sizes, with filtering capacities of from 300 to 500 gallons per 24 hours.

Referring to the accompanying illustration, the mixed oil and water is received through the inlet at the top of



THE CROSS STYLE "B" OIL FILTER.

the filter and then passes through a layer of waste, which collects all the heavier impurities of the oil. From thence it passes through the perforations in the bottom of chamber B, following the course indicated by the arrows, into tube C, and from here on to the filter plate D. The increased weight of the water has a tendency to keep the oil back in tube C, but when the pressure of the oil in chamber B becomes sufficient the oil is forced down and spreads over the plate D in a very thin film. This constantly changes surface and grows thinner as it travels from the center to the circumference of plate D, thus exposing every particle of oil to the action of the water. It then flows on to plate 1D and 2D, going through the same process in each case. When the oil leaves the plate 2D it is in a finely divided state and is thoroughly washed by the water. It is separated from the water by gravity, and all the remaining impurities settle in chamber E, from which they can be drained to the sewer by opening the gate valve at the bottom of the filter. From the plate 2D the oil rises and again filters through F, another layer of waste, into the pure oil chamber, where it accumulates until it overflows into the oil reservoir. The water is automatically separated after it passes down the tube C and reaches the bottom plate, on account of its being heavier than the oil, and the surplus water passes into the pipe leading to the automatic water separating device. The filter will meet a particular field of usefulness in its ability to reclaim waste cylinder oil, the most expensive oil used about a plant, and the filtered product can be use to lubricate pumps and other machinery.

The New England Foundrymen's Association.

The New England Foundrymen's Association held their May meeting in Providence, R. I., Wednesday, May 11. It was rather in the nature of an outing than a formal meeting. The party, numbering more than 90, assembled at the railroad station at 2 o'clock and went immediately to the new foundry of the Brown & Sharpe Mfg. Company, where two hours of very instructive inspection were put in. W. A. Vialle of the company received the guests and bade them welcome, after which they had the liberty of the foundry end of the great works. The remainder of the afternoon was occupied by a carriage drive about the city, which was much enjoyed. The Providence members, headed by A. J. Miller, Jr., of the Whitehead Brothers Company, who had charge of the arrangements, acted as guides, and pointed out the various places of interest.

Dinner was served shortly after 6 o'clock at the Wellington restaurant. A short business meeting was held, at which it was announced that the managers of the St. Louis Exposition had decided to bear the entire expense of the foundry exhibit, and that contributions made by members of the association would be returned to them. These new members were elected: Piling & Crane, Boston; Stanley Work, Bridgewater; Boston Fire Brick Company, Boston, and the James A. Colvin Foundry, Worcester.

President B. M. Shaw of the association introduced former President Henry A. Carpenter of Providence as the toastmaster. Excellent after dinner speaking followed by Lieutenant Governor George H. Utter of Rhode Island and George A. Littlefield, a prominent Providence lawyer. A vote of thanks to the Providence people, who had been such pleasant hosts, was taken.

The June meeting of the association will be held at the Exchange Club, Boston, June 8. O. P. Briggs, commissioner of the National Founders' Association, will speak before dinner, his subject being "The Foundry Apprentice System." A quiz meeting will come after dinner. The July meeting will be replaced by an outing, as is the custom of the association.

Labor Bureau at Bridgeport, Conn.—The Manufacturers' Association of Bridgeport, Conn., have established a labor bureau which is already on a successful working basis in the Court Exchange Building, in that city. The bureau is patterned after those in operation in various cities under the auspices of metal trades associations, but of broader scope, being made up of diversified industries located in Bridgeport, all kinds of manufacturing concerns being eligible to membership. The purpose of the bureau is to find employment for idle workmen, and at the same time to assist employers in securing help by providing suitable men upon application. The Manufacturers' Association wish it stated that they will be glad to co-operate with other similar associations in promoting their welfare and the welfare of manufacturers generally throughout the country. H. W. Hawley is in charge of the bureau as corresponding secretary of the association.

The Amalgamated Association.—The proceedings of the Amalgamated Association of Iron and Steel Workers, in session in Cleveland, Ohio, this week, will likely be of much interest. The annual election of officers will be held, and it is probable that all the old officials, including President T. J. Shaffer, will be elected for the third time. In regard to the wage scales it is probable that the present puddling, bar iron and sheet and tin plate mill scales will be reaffirmed and presented to the manufacturers who operate union mills for their signatures for the year commencing July 1.

The Hot Blast Temperature Equalizer.

The hot blast temperature equalizer is the invention of Gjers & Harrison of Middlesbrough, England, whose representative in this country is E. A. Uehling, 135 Broadway, New York. It consists of a shell constructed of steel plates similar to that of a hot blast stove of the Siemens-Cowper type. This shell is filled with fire brick checker work, preferably with a partition wall through the center, as shown in Fig. 2. It is located between the stoves and the blast furnace which it serves, as shown in Fig. 1, and is so connected that all the blast heated by the stoves in their regular turn passes through the equalizer before entering the bustle pipe.

The checker work is supported on piers, as is usual in stove construction. Provision is made against loss from radiation by inserting about 4 inches of insulating material between the shell and the wall encircling the checker work at the bottom and over the top arch. Slag wool answers well for this purpose. The bottom of both sides of the equalizer is made with a sloping curvature for the purpose of reducing the space under the checker work. In the concrete filling or brick work supporting the partition wall is located a flue connected with the cold blast main from the outside, and by suitable ducts also with the exit chamber, for the purpose of reducing the temperature of the blast to any degree below that of the equalizer if desirable.

By means of the cold blast valve located conveniently to the pyrometer house, the temperature of the blast can be quickly regulated between the limits of the heat stored in the equalizer and that of the cold blast, according to the requirements of the furnace.

The arrangement of setting of stoves and equalizer will vary more or less in every case; that herewith illustrated is the simplest and most direct possible. A bypass may be arranged so that the equalizer can be cut out at any time if anything should go wrong with it. But since the construction is so simple, and its functions are entirely static, a contingency that would put it out of order is so remote that a bypass becomes quite unnecessary and would prove a useless expenditure. There is no mechanism connected with the equalizer, except the cold blast regulating valve. The checker work is never subjected to a temperature sufficiently high to prejudicially affect the brick. The only dust which can enter the equalizer is that which may be carried away by the blast from the accumulations in the stoves, which being in the swirl of the blast will be carried through the equalizer into the furnace. There is, therefore, no reason why the equalizer should ever get out of order.

The heated blast enters the equalizer through the hot blast main direct from the stoves near the bottom on one side, passes up through the checker work into the dome shaped space above, and down through the checker work in the opposite side of the central partition wall and out near the bottom on the opposite side, through the connecting main into the bustle pipe. So long as the temper-

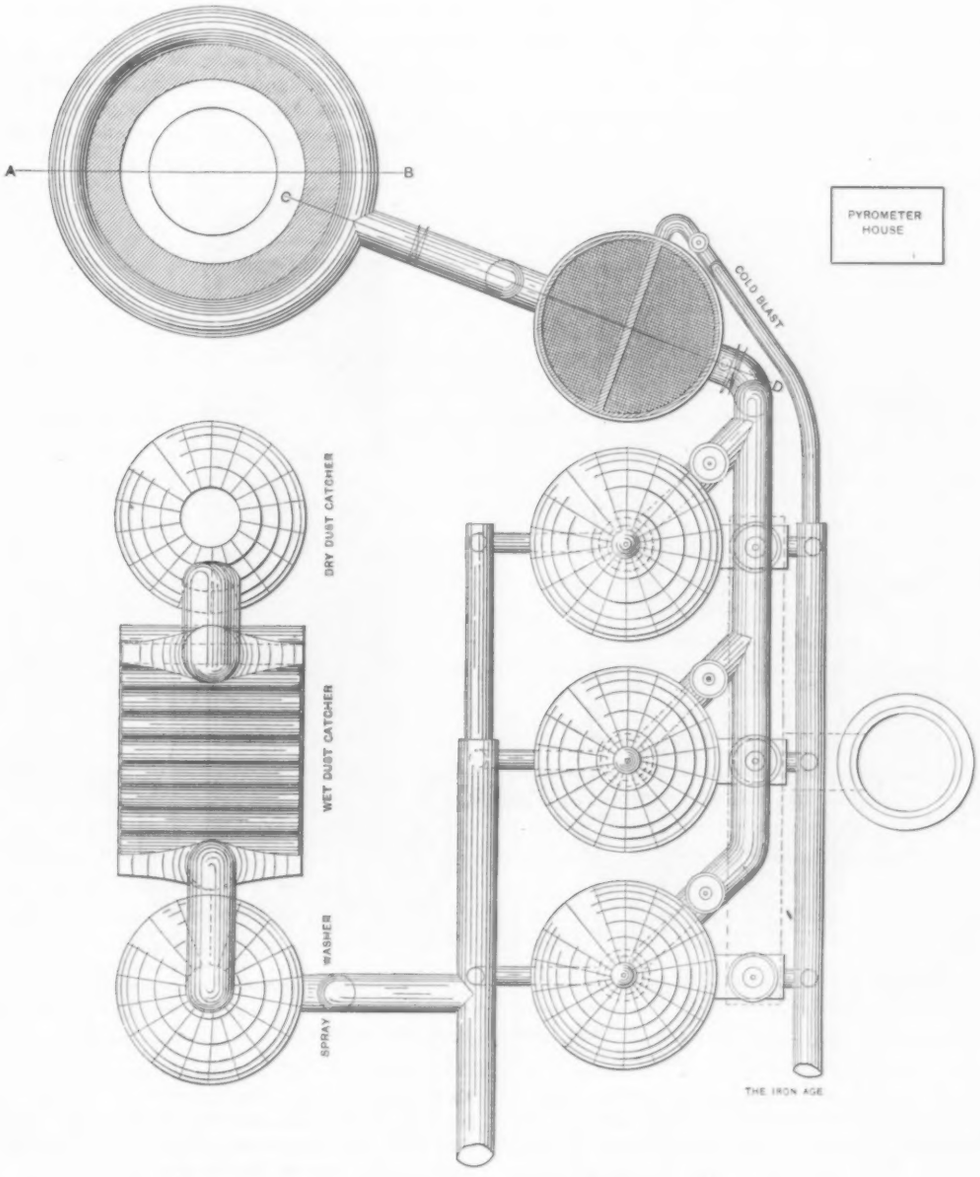


Fig. 1.—Plan of Furnace and Equalizer.

ature of the checker brick in the equalizer is lower than that of the entering blast they will continue to absorb heat. In a short time, however, they will have attained the average temperature of the blast throughout, after which the equalizer will perform its function regularly and continuously so long as the stoves supply the total quantity of heat required.

When a fresh stove is put on, the excess of temperature, above the average, is absorbed in passing through the equalizer and retained until the heat of the entering blast begins to fall below the average, when it is again given out, bringing the blast temperature up to the average. In an equalizer of proper size and proportion the ordinary temperature differences of 150 to 250 degrees should be equalized in passing through the first half of the checker work, leaving the second half as a reserve for taking care of abnormal temperature differences, and to serve as a reservoir of heat. With clean gas there is no difficulty in carrying from 1300 to 1500 degrees of heat on the stoves or an average of 1400 degrees in the equalizer.

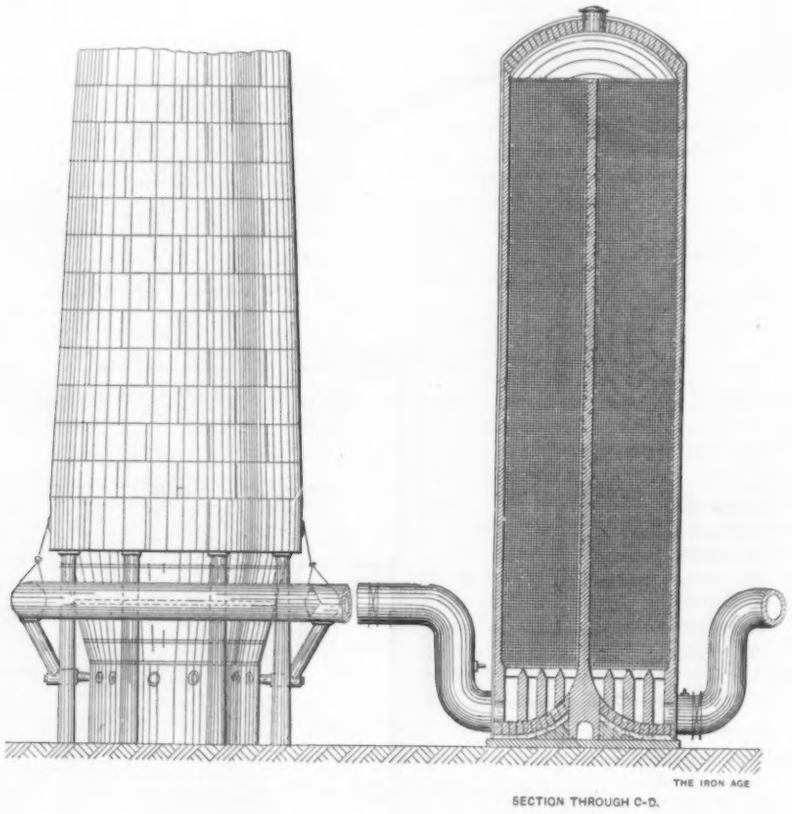


Fig. 2.—The Gjers & Harrison Equalizer.

By means of the cold blast this may be tempered down to anything the furnace may require. Under normal running conditions the maximum even temperature of blast, suitable to hight of furnace and kind of raw material smelted, is most conducive to best economy; but at the same time there should be a reserve of 150 to 200 degrees and the temperature of blast should be under control; the greater the range of control the better.

A furnace working stiff, or hanging up, may generally be brought down by reducing the blast temperature, but after it has come down it may require the highest available heat to neutralize the chilling effect due to slipping. The equalizer stores up heat for such contingencies, and is, therefore, useful in two distinct and most important functions: 1, As an equalizer of blast temperature; and, 2, as a reservoir of heat.

The one drawback to the regenerative hot blast stove is the variation in the blast temperature, which is rarely less than 200 degrees, and not infrequently reaches 400 degrees (see temperature record, A A, Fig. 3) in an hour's blowing. Such temperature changes may be and frequently are the cause of scaffolding in a furnace, the effects of which on fuel consumption and on reduction of quantity as well as quality of product are always costly, and may become very serious. This fact is fully recognized by every blast furnace manager, and at the majority of furnaces, which are properly equipped with pyrometers for measuring and recording the temperatures so that he can work intelligently, it is the established practice to equalize the temperature by the admission of cold blast, and by close attention this can be accomplished with fair success (see B B, Fig. 3).

It is evident, however, that since the temperature of the blast coming from the stove is constantly changing, the amount of cold blast introduced for equalization must change in a similar manner. The kinks in the records show that the cold blast valve was manipulated about every five minutes. At some plants a boy is detailed, whose sole duty it is to watch the pyrometer and manipulate the cold blast valve.

To avoid the necessity of personal attention to the cold blast valve, Samuel Vaughn, superintendent of blast furnaces at the Lorain Steel Company, has contrived a very ingenious apparatus, by means of which the cold blast valve is controlled by electric contact, made by the pen rod of the Steinbart recording gauge used in connection with the pneumatic pyrometer (C C, Fig. 3, shows a temperature record thus regulated).

Where four stoves are available in order to get a more regular blast temperature, the expedient is frequently resorted to of having two stoves on blast, arranging the time of changing so that the high temperature period of one stove overlaps the low temperature period of the other. In this way the variations of temperature may be fairly well equalized by proper attention to the valves. This method, however, requires double the number of stove changes, and since only two stoves are on gas at one time it reduces the heating capacity of a four-stove plant to that of a three-stove one, and accomplishes the purpose in an imperfect manner.

The efforts made to obtain a more regular blast temperature show that furnace managers fully appreciate its value, and the results illustrated show that equalization of blast temperature has been only indifferently accomplished by the more or less troublesome methods applied.

The Gjers & Harrison equalizer accomplishes perfect equalization of temperature with the minimum of attention (see autographic records, D D and D^1 D^1, Fig. 3, which

were simultaneously taken). The temperature of blast from the equalizer is always the maximum average which the stoves are capable of imparting. By opening or closing the cold blast valve the heat of the blast may be regulated to any desired temperature of blast below the maximum available; it can be regulated at once, and the required temperature will remain constant without further attention until, in the judgment of the blower or superintendent, the furnace requires a change.

Since the equalizer automatically takes care of all irregularities of temperature, the frequency of changing stoves can in many cases be so regulated that one stove

Fig. 3.—Autographic Records from the Pneumatic Pyrometer.

man will be able to tend two or more sets of stoves instead of one, as is customary at present, or his time may be otherwise usefully employed without affecting the regularity of blast temperature.

The capacity of the equalizer to store heat is a feature of great value. A three-stove plant with an equalizer is very much more efficient than a four-stove plant, and costs appreciably less.

A bill to incorporate the Massachusetts Casualty Company to do a steam boiler insurance business is well on their way toward passage by the Massachusetts Legislature. The capital stock of the company is $200,000. The incorporators are Philip Dexter, G. L. Peabody, G. C. Lee, Jr., Allan Forbes, C. A. Grant, W. A. Tucker, Charles Head and F. R. Hart.

Harvard to Absorb the Massachusetts Institute of Technology.

The Massachusetts Institute of Technology, Boston, Mass., has taken the initiative in a plan to merge with Harvard University. The corporation of the institute recently adopted the following resolution, which may have as a result the combining of the two great institutions as one: "Voted, that the Executive Committee be requested to ascertain whether any arrangement can be made with Harvard University for a combination of effort in technical education such as will substantially preserve the organization, control, traditions and the name of the Massachusetts Institute of Technology." Negotiations between the Executive Committee and the Harvard corporation have been formally opened.

It is presumed that the Technology corporation had a pretty definite understanding as to the sentiment of the university before the matter was given to the public, and, in fact, it is generally understood that the Harvard corporation and the alumni of the university are favorably inclined toward a combination that will add so greatly to the importance of that great American educational institution. Harvard numbers about 4500 students and Technology has about 1500, which would bring the grand total up to 6000. But, while the numerical element is important, the mutual advantages which would result from the educational point of view would be vastly greater, and, of course, there would be economies which

would make existing funds go further in accomplishing their purposes. The Harvard Scientific School would happily merge into the Technology. Probably the real opposition to the merger will come from the Technology alumni, who would resent anything that would wipe out the individuality of their *alma mater*.

The World's Fair Foundry Building.

The accompanying illustrations will give a fair conception of the Foundry Building, which is being constructed at the St. Louis Exposition as headquarters for visiting foundrymen, and as a building for housing the exhibits of foundry equipment and foundry products.

When the accompanying drawing of the ground plan was prepared it was expected that the foundry room proper would be 100 feet wide and only 80 feet in length, but the demands for space in which to exhibit foundry equipment have rendered it necessary to add on the additional 20 feet to the length of the foundry, making this part of the building 100 feet square. The details shown in the arrangement of the ground plan will be subject to change during the installation of the exhibits. The installation of the cupolas, cranes, core ovens, and some of the heavy material is expected to begin by the 20th, and to be completed by May 30.

Immediately adjacent to this foundry building is a

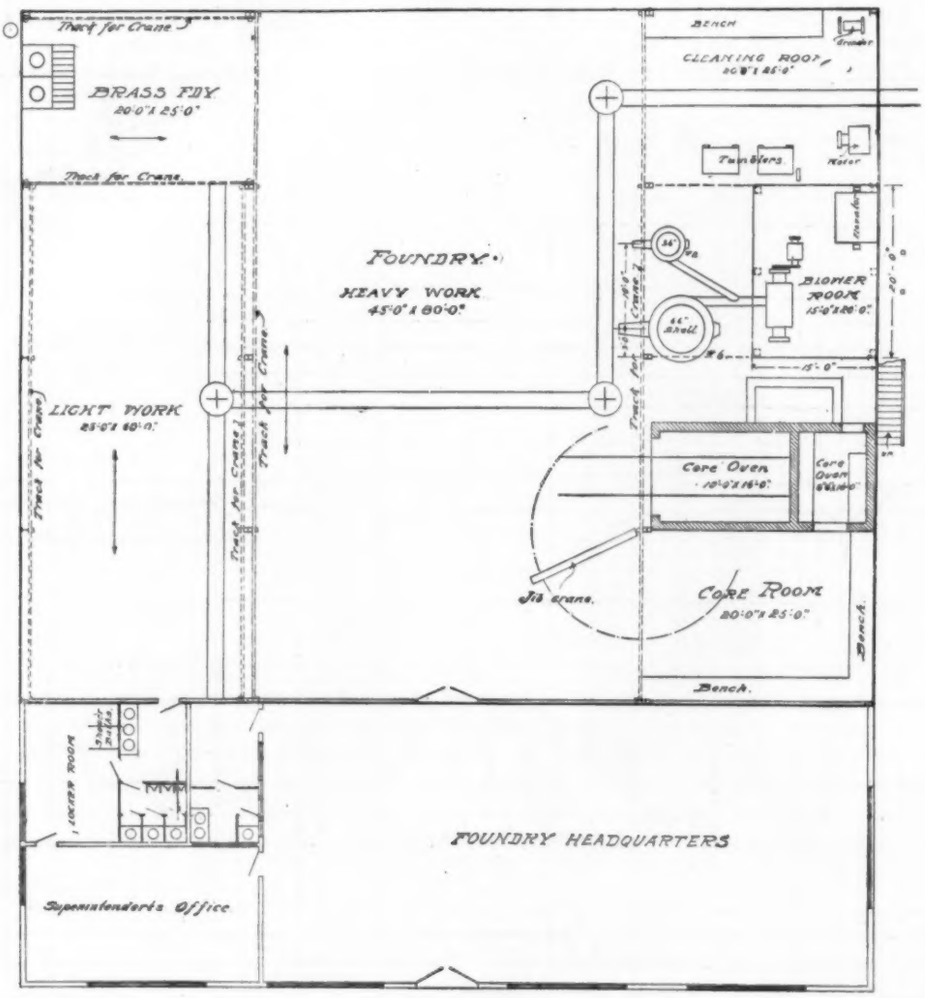


Fig. 1.—Floor Plan.

THE WORLD'S FAIR FOUNDRY BUILDING.

The building has a steel frame, with sides of corrugated iron and with roof partly of corrugated iron and partly of composition material. It is being constructed by Christopher & Simpson, architectural iron workers, St. Louis.

The part of the building in which most of the foundry equipment will be exhibited, and in which a portion of this equipment will be operated, is 100 x 100 feet, with the general subdivisions as indicated on the floor plan, Fig. 1, and cross section, Fig. 2. Attached to the front of the foundry building proper is a room 100 feet long by 32 feet wide, the larger portion of which is to be used as a headquarters for foundrymen visiting the Exposition. At one end of this space is arranged a superintendent's office, toilet room and a locker room. The foundry headquarters will be further subdivided in such a manner as to make it a convenient meeting place for foundrymen and as a suitable place for the exhibition of foundry drawings, patterns, small castings, &c.

smaller Metal Pavilion, 60 x 100 feet in size, in which is being arranged a laboratory for making analyses for foundry materials and products and equipment for such lighter foundry work as electroplating, &c. On another area adjacent to the Foundry Building will be installed a battery of coke ovens, and a coal washery plant in which an elaborate series of experiments will be carried on during the summer and autumn seasons, in order to test the coking qualities of coals from different parts of the United States, and the extent to which the quality of the coke made from the different coals may be improved by first washing the coal of a considerable portion of its sulphur and ash. In the Foundry Building itself will be installed one or more testing cupolas, in which the cokes made from the different coals under different conditions will be thoroughly tested as to their suitability for foundry purposes.

It will be seen, therefore, that the foundry exhibits and the foundry work which are being arranged for at the Exposition will not only be of interest to the foundrymen and to the general public, but will, it is believed, have a considerable value in testing the possibilities in the way of improving the quality of the coke for foundry purposes made from the different coals in the United States.

St. Louis World's Fair Notes.

The fence which stands in front of the French reservation along University Way is all in wrought iron. It is about 450 feet long and 12 feet high. It was designed by G. Umbdenstock and Roger Bouvard, architects of the French Pavilion, and executed by Louis Maison of Les Riceys, Aube, France. G. Bertrand is in charge of the mounting. The fence has three gates and four artistic pilasters adorned with flowers and fruits in wrought iron. The fence will be painted in dark green and gold.

Cars began running on the Intramural road May 10. Twentyfive cars are on the grounds, but for the present only 18 will be kept in operation. More will be added when necessary. The cars will be run on a regular schedule of five minutes. Seventeen stations have been erected at different points of interest throughout the grounds. The route will enable visitors to view practically all of the buildings and grounds. The fare is 10 cents.

The Liberty bell, the most revered of all the national relics, will for the first time in its eventful history cross the Mississippi River, and may be viewed by World's Fair visitors some time in June. The bell is the property of the city of Philadelphia, and many prominent Pennsylvanians, among them Governor Pennypacker, strenuously opposed the proposition to permit the famous bell to leave the borders of the State. There was such a demand, however, among patriots in all sections for the display of the bell at the World's Fair that the opposition was overcome, and the Philadelphia City Council adopted a resolution appointing an escort of 24 to escort the Revolutionary relic and appropriating $15,000 to defray the cost. The old bell is 12 feet in circumference around the lip and 7 feet 6 inches around the crown. It is 3 inches thick in the thickest part near the crown. The total weight is 2000 pounds.

Work was begun on May 9 on the building for the aerial exhibit at the World's Fair. Twelve acres of ground has been allotted for the exhibit. A fence 30 feet high will inclose it. The stockade for the air ships is 88 x 180 feet. Doors at each end permit the entrance of the largest air ship. A 100-ton gas generating machine will be installed, which will furnish gas for contestants free of charge. At present there are 55 entries in this contest, which offers $200,000 in prizes.

It is announced that the Ferris Wheel will be in operation on the fair grounds this week. It is called the "Observation Wheel" at St. Louis and is owned by the Observation Wheel Company, of which members of the Chicago House Wrecking Company, Chicago, are leading owners, Mr. Harris being president of both companies.

The first preliminary locomotive test on the Pennsylvania Railway testing floor in the Transportation Building was conducted last week, with a view to correcting any faults in the apparatus. Formal tests of locomotives will probably begin this week. These tests are being conducted by employees of the Pensylvania Railway, under the supervision of the Advisory Committee, which includes the following representative engineers: On behalf of the American Society of Mechanical Engineers—Prof. W. F. M. Goss, dean of the Schools of Engineering,

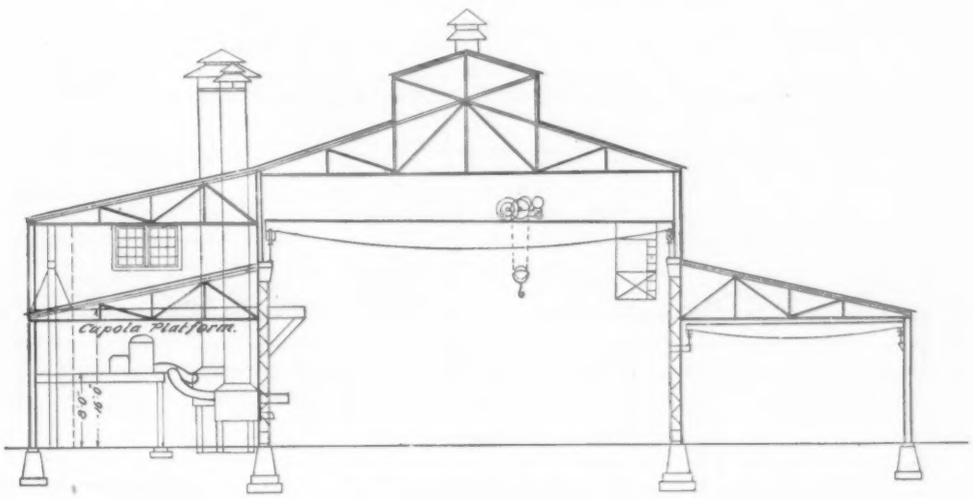


Fig. 2.—Cross Section.

THE WORLD'S FAIR FOUNDRY BUILDING.

Purdue University; Edwin M. Herr, general manager Westinghouse Air Brake Company, and J. E. Sague, mechanical engineer, American Locomotive Company. On behalf of the American Railway Master Mechanics' Association—F. H. Clark, superintendent of motive power, Chicago, Burlington & Quincy Railroad; C. H. Querreau, superintendent of shops, New York Central & Hudson River Railroad, and H. H. Vaughan, assistant superintendent of motive power, Lake Shore & Michingan Southern Railway.

Plans are being completed for extensive tests of electric railway equipment in the Palace of Electricity. These tests will be conducted under what is known as the Electric Railway Test Commission, among whom are Prof. H. H. Norris of Cornell University, Prof. B. V. Swenson of the University of Wisconsin, and Professor Plumb of Purdue University. An experimenting corps of 40 men are to be employed, and a great variety of materials and appliances for electrical railways are to be tested publicly during the life of the fair.

A party of 15 officials of the American Bridge Company, headed by President A. J. Major of Pittsburgh, Pa., and President J. A. Hatfield, American Bridge Company of New York, visited Milwaukee on May 14 and inspected the Milwaukee works, known as the Milwaukee Bridge & Iron Company's plant, on St. Paul avenue.

Electrically Driven Rolling Mills.*

I. Three-High Mills.

Small mills, with motors from 300 to 600 horse-power, have been in operation for several years, and that the same have given satisfaction is evinced by the fact that five larger mills requiring from 1000 up to 1800 horse-power are now being arranged for electric driving.

At Peine is a small merchant mill, of which the roughing train was formerly coupled direct to the engine shaft and the finishing train driven by ropes from the fly wheel. Power is now furnished by a direct current compound wound motor, coupled to the finishing train, while the roughing rolls are driven by a belt running on the engine fly wheel, which has been left in place. This arrangement permits the use of a high speed and therefore economical motor, the speed of which can be regulated between 300 and 450 revolutions. Its normal power is 250 horse-power, with a maximum of 350, and it is provided with a cast steel fly wheel serving as a belt pulley. Fig. 1 reproduces current diagrams taken on this mill, and shows also the speed. It will be seen that as the current increases the speed decreases, enabling the fly wheel to reinforce the motor when needful.

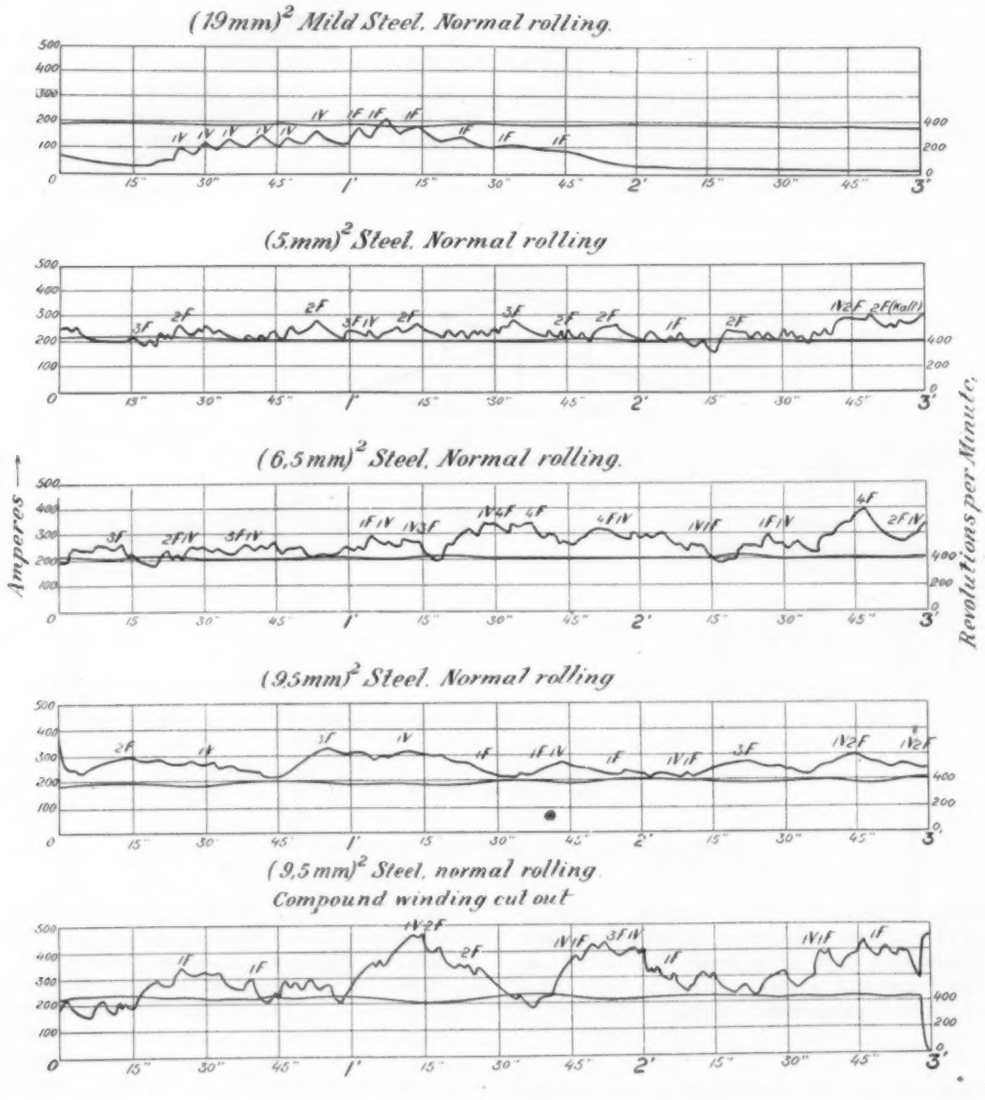


Fig. 1.—Current and Speed Diagrams of Merchant Mill at Peine.

Regulation of Motors.

Motors for mill driving must be susceptible to two kinds of regulation. In the first place, it must be possible to set them for a normal speed, according to the desired circumferential speed of the rolls; and, secondly, this having been done, they must slow down considerably as the load increases, in order that the energy stored in the fly wheel may be utilized. According to the formula, if the speed decreases 10 per cent., then of the energy stored in the fly wheel 19 per cent. will become available. This regulation is variously accomplished, according to whether direct or alternating current is used. With the former the desired end is attained by means of shunt winding. As the current in the shunt diminishes the magnetic field is weakened and the speed increases, since the product of field strength and speed is a constant for each motor, so that it is possible to govern within wide limits. A direct current motor with simple shunt winding, however, with increasing load would only slow down about 2 or 3 per cent., insufficient to allow the momentum of the fly wheel to come into play. The speed should decrease 10 per cent. between running light and normal load, and 15 to 20 per cent. between running light and maximum load, and to attain this compound winding is necessary. The result is clearly seen in the last diagram of Fig. 1, which shows the much greater variations in the current when the compound winding is cut out. The upper curves I, II, III and IV on the right of Fig. 2 show the changes of speed as the turning moment increases, I representing the highest speed, and therefore the weakest field, and IV the slowest speed and strongest field. The lower curves I to IV show the work of the motor in horse-power dependent on the turning moment; at the lower speeds the power of course decreases. The regulation of speed, both as regards setting for the speed desired and decreasing the same as the load increases, is effected with direct current without any appreciable loss of efficiency. On the other hand, with alternating cur-

* Condensed from a paper read at Duesseldorf before the Verein Deutscher Eisenhuettenleute, by H. Koettgen.

rent, in order to regulate the speed it is necessary to introduce resistance into the armature equivalent to loss of work, which loss, however, remains comparatively small until the speed is materially reduced. The economy of such a motor is, of course, dependent on the duration of the decreased speed. The work lost in the resistances can be easily determined for each load of the motor, as it is proportional to the decrease of speed, and is a percentage of the relationship of this decrease to the no-load speed of the motor. If, for instance, the latter is 100, and this, by introduction of resistance, is reduced 15 per cent. —that is, to 85—the loss in the resistance amounts to 15 per cent. of the total work; so that if the turning moment amounts to 2000 horse-power the loss is 30 horse-power. By this introduction of resistance the necessary fixed normal speed and reduction when the load is increased are provided for. The upper curves to the left of Fig. 2 show this dependence of the speed on the turning moment. In general, with alternating current, it is advisable to work with curve I—that is, to run the mill in such a way that the motor, running light, has the speed for which it was built—decreasing 10 per cent. for normal and

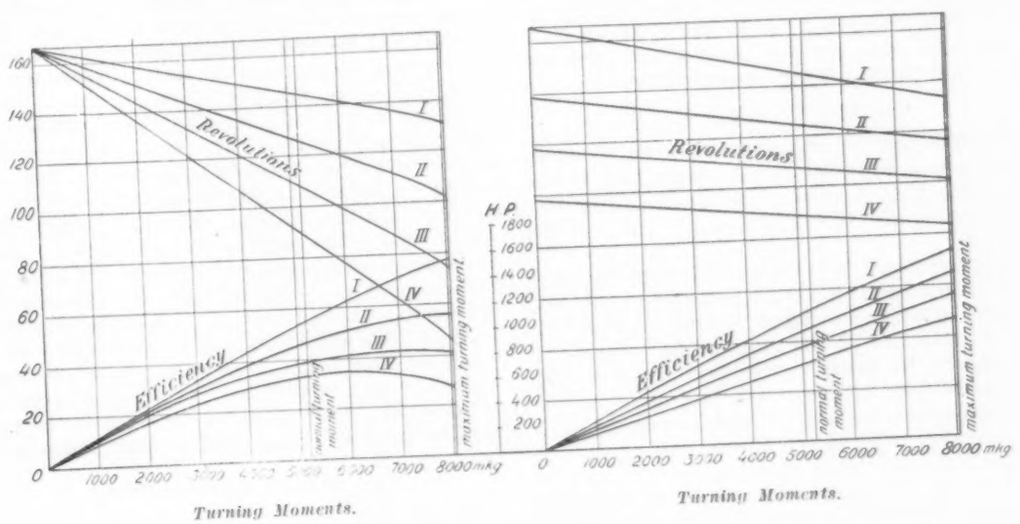


Fig 2.—Relations Between Turning Moment, Efficiency and Revolutions of Rolling Mill Motors.

15 to 20 per cent. for maximum load. This is accomplished by an adjustable resistance, fixed permanently in the armature. If it becomes necessary to work at a lower speed this resistance must be increased, in order that the reduction may become greater, corresponding to curves I, II or even III. It must not be forgotten, however, that all the curves, when running light, pass through one point, that of the no-load speed. When there is nothing in the rolls this speed will be quickly reached, so that, when another piece enters, the motor will have to cope with the increased speed until it adjusts itself to the load. If this is to be prevented it will be necessary to introduce resistance as soon as the increased speed is noted, the starting resistance being the best for the purpose. This can be done either by the operator or automatically by means of a centrifugal governor. It is possible with alternating current to set the normal speed lower than the maximum of the motor without loss, this being done by reversing the polarity. If the motor is arranged for two speeds, they are either as 1:2, 2:3, or 3:4. Usually either of the last two will suffice. It is possible to arrange for three speeds, but this necessitates a larger and more costly machine.

Balancing the Power.

The problem of balancing the power needed is one of great importance, in order that both dynamo and motor may be protected, and it is usually solved by the use of heavy fly wheels. In figuring their weight it is necessary to know how many passes are made at one time and their duration, for it is plain that the amount of power the motor will have to furnish direct—that is, without help from the fly wheel—depends on these factors. By means of current and speed diagrams made on existing mills it is possible to obtain the necessary data as to the conditions to be met. How far it is necessary to go to protect the generating station from too great variations of load depends principally on the character of the station, the other needs which it has to supply and whether it is built to cope with considerable overloads. If it is necessary to avoid varying loads as much as possible, the simplest means is to increase the weight of the fly wheel. An arrangement of this kind has been carried out with a 1000 horse-power motor at the sheet mill of the Friedenshuette. A motor with the comparatively high speed of 215 revolutions per minute has been used together with a rope drive. The speed permits the use of a fly wheel of steel, cast in one piece, running at a speed above the usual limits, and therefore able to store a large amount of energy for each pound of its weight. In addition, an automatic arrangement can be used to prevent the passage of more than a fixed maximum current. With direct current this acts by strengthening the shunt field of the motor and with alternating current by adding resistance in the rotating member. If a still further equalization of the load on the generating station is desired, nothing remains but to install, between generating station and mill, either a motor generator set with heavy fly wheel attached or a storage battery.

The use of a motor generator makes possible a simple method of regulating the speed of the mill by coupling direct to the shaft of the same a generator for each and every driving motor and raising or lowering its voltage by the shunt. This also obviates the necessity for a starter, as the driving motors can be started by lowering the voltage in the primaries. In most cases the use of either fly wheel or battery will be unnecessary. Only when power is obtained from a public station, where such heavy variations of load would be inadmissable, or from a distant source, where trouble might be caused in the conductors, is some such arrangement advisable.

As regards possible damage to the motor driving a rolling mill, caused by the shocks to which it is liable, it is shown by calculation that the motor is able to withstand without injury a check many times greater than that sufficient to burst the fly wheel. It follows that the protection afforded by breaker coupling, blocks, &c., as used in engine driven mills, is amply sufficient to save the motor from harm.

Electric Driving Versus Gas Engines.

Comparing the relative advantages of electric driving and the use of gas engines coupled direct to the mill, the following are the chief points to be considered. There is nothing impossible in the latter method, as experience has shown, and the difficulty of starting, caused by the great inertia of the mill, can be overcome by the use of larger compressed air reservoirs or some form of clutch coupling. Electric motors will be preferred when the mill is some distance from the blast furnaces, on account of cheaper transmission; but they have other advantages,

notably a very high security of operation, as is shown by their extended use in large units in all branches of industry. With gas engines, on the other hand, occasional stoppages are unavoidable; apart from the greater liability to breakage of some small part, they must be inspected at short intervals in order to keep them in good shape. By installing all the gas engines in a central power house they not only will be tended more carefully than in the mill, but a reserve of power will be always available. The introduction of electric transmission will add to the first cost, but against this must be set the fact that larger (and therefore less expensive) engine units can be used. Then, too, as all the mills will not be using their maximum power simultaneously, the capacity of the power house can be measured by the average of the power needed. Another great advantage is the facility which motor driving offers for measurement of the power used, affording a continuous control, not only over the condition of the mill, but also over the roll design. This will tend to a lower consumption of power and an improvement in quality of the product. In the diagrams made with a recording ammeter, and reproduced in Fig. 1, the first curve shows the current used while a bloom makes the successive passes. By this means the power needed for each and every section rolled can be exactly determined and also for every pass. By the use of a wattmeter the total power required per ton can be ascertained.

II. Roll Tables.

Before considering the problem of electrically driven reversing mills some attention may be given to roll tables, which are subject, on a small scale, to the same conditions, and which are an indispensable adjunct of the same.

The important factor to be considered in the design of motors for this purpose is not the moment of friction, entailed by the machinery moving at its highest speed, but solely the starting and accelerating moments necessary to raise to the desired speed, in the short time available, the considerable mass of the rollers and other moving parts. To determine the size of motor required it is therefore necessary to know the number and dimensions of the rollers, the maximum speed required, the time allowed to attain this speed from the time of starting and the number of reverses per minute. The motor should be constructed for as low speed as possible, but as this type is more expensive than the high speed machines, it will in general be advisable to so arrange matters that one-fourth to one-third of the energy needed to raise the speed shall be required for the armature itself. By this means it will be possible to use a motor with a speed of 300 to 750 revolutions by using two reductions in the gearing and allowing 50 revolutions per minute as the speed of the rollers. Carrying through this calculation, it will be found that the maximum moment required from the motor to give the acceleration needed is 10 to 15 times that required to overcome the friction of the table. This figure, of course, depends entirely on the nature of the installation. A blooming mill table is comparatively short, but requires a very rapid reverse and the figure will be large. The rapidity with which such a table can be operated is shown by Fig. 3, which is the reproduction

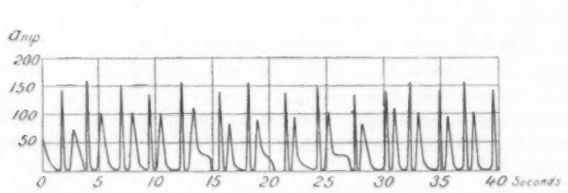


Fig. 3.—Current Diagram of an Electrically Driven Roller Table (Blooming Mill).

of a current diagram taken at the blooming mill of the Rheinische Stahlwerke, and shows 15 reverses in 40 seconds. For other mills, as the product becomes smaller, the relative power required for acceleration as compared with that for overcoming friction decreases as the tables become longer and partake more of the nature of simple conveyors. Rapid stopping is just as essential as rapid starting for fast work. With direct current this can be obtained by short circuiting the armature by successive steps, thus destroying the inertia of the moving mass. The same effect is caused by simply reversing the current, and with alternating current this is the only available means. It is frequently used with direct current, as it simplifies the work of the operator, who by a single movement puts on the brake, reverses and accelerates in the opposite direction. For direct current series wound motors of the railway type are used, which when starting are operated first in series and then in parallel, whereby power is saved. Fig. 3 shows the current used by such an arrangement, each reverse showing two maxima, the first when the motors are in series and the second when in parallel. For alternating current only one motor can be used, to the armature of which contact rings are attached, by which means the starting resistance is introduced.

The mechanical arrangement of the table motor and gearing demands great care, as it is subject to very numerous and heavy strains. The railway type of motor in a water proof and dust proof case is very suitable, and it is advisable to mount the whole on a common base plate. Cut steel gears, incased and running in oil, should be used, and the bearings should also be dust proof. The motors may be mounted on springs, as is customary in railway practice, but this is not essential. The controllers also need careful consideration, as they, too, work under severe conditions. If metal contacts are used their surface and mass should be large, but a carbon contact is better, as fusing of metal to metal thereby becomes impossible, and less skillful handling is needed. The number of steps in the controller need not be very great; only in connection with conveyor tables on which the piece has to be stopped at exactly the right place (a shear or saw), are a couple of additional steps advisable. For the blooming mill table and similar places, where even short stoppages are very costly, it is well to have two controllers, either of which can be put into service by simply throwing a switch. They should be arranged on the same platform as the levers for operating rolls, manipulator, &c.

III. Reversing Mills.

Before proceeding to the design of an electrically driven reversing mill a clear conception must be formed of the forces involved and power needed. The maximum turning moment required must be known in order to give to the motor sufficient power. Furthermore, data as to the work, expressed in foot pounds, needed to roll an ingot of known size and weight down to various sections are necessary. This, in conjunction with the maximum output per hour, will enable the average load of the motor, and consequent heating, to be calculated and also the total current needed. On the latter is dependent the capacity of the power house and the economy, or the reverse, of the installation. If a steam driven mill already exists, the maximum turning moment required can be easily determined from the dimensions of the engine, the ratio of the gearing, the steam pressure and possibly an indicator diagram, together with the mechanical efficiency of engine and gearing. Most engines for this purpose have a maximum indicated horse-power of about 7500, and if this figure is taken an effective power of 6000 horse-power may be reckoned on. The motor must be designed, therefore, to give a turning moment equivalent to 6000 horse-power at the maximum speed of the rolls. Motors have a great advantage over steam engines, in that an upper limit to the turning moment, such as is the case in a steam engine with maximum filling, does not exist; a motor built for 6000 horse-power can overcome a turning moment corresponding to 7000, 8000 or 9000 horse-power.

The determination of the amount of power needed to roll out an ingot is not so simple, but the data are necessary for the work. Investigations were made in the blooming mill of the Gutehoffnungshuette at Oberhausen with the object of determining by means of continuous indicator cards the energy used to roll to various lengths. The ingots rolled weigh 2.2 tons, have a mean sectional area 16½ x 16½ inches, and are 67 inches in length. The engine has two cylinders 51.2 inches in diameter and 51.2

inches stroke, and works non-condensing. The gear ratio between engine and mill shaft is 1 : 2.5. The maximum speed of the rolls is 55 revolutions per minute. The diagrams were made with an indicator attached in front of the piston only, but in spite of this fact the calculated values may be accepted as correct on account of the large number of indications taken and the regularity of the results. Simultaneously the initial and final dimensions

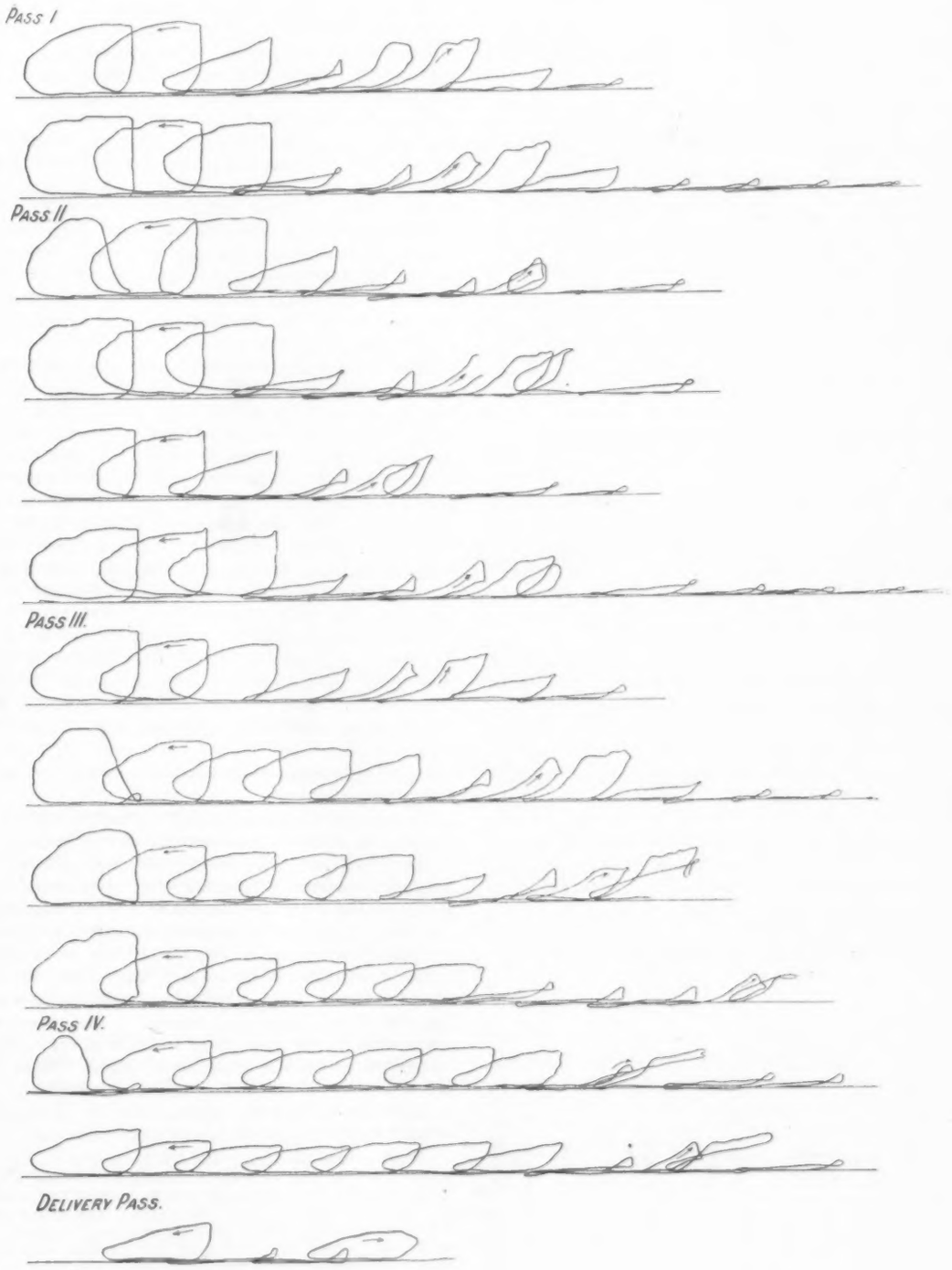


Fig. 4.—Indicator Diagrams Taken from a Reversing Blooming Mill, Oberhausen.

of the steel were noted, and also the quality (hard or soft, Bessemer or open hearth). Fig. 4 shows one series of diagrams which, for the sake of clearness, has been extended. Twelve groups of diagrams are shown, one for each pass, and the groove through which the pass was made is given. The diagrams show plainly the handling of the engine by the engineer. He throws the lever to its extreme limit in one direction, and when the piece has reached the rolls opens the throttle to its full capacity. As soon as the piece has gone through he shuts the throttle and throws the reversing gear over in order to destroy by back pressure the inertia of the moving masses. For this purpose the throttle is again opened, and we attain two, three or four back pressure diagrams, according to the speed. The engine is thus brought to a standstill and then slowly reverses, after which it runs with the throttle almost closed, as may be seen by the no-load diagrams. A large number of these are shown at the second and sixth passes, owing to the time taken to turn the piece. The diagrams were used to determine by means of the planimeter the work done in each pass, only the area of the first diagrams, or those which represented the actual work, being considered. From the values thus obtained was deducted the energy stored up each time in the moving mass. The moments of inertia of the moving masses were found by calculation and the maximum number of revolutions noted for each pass, so that the number of foot pounds stored in the moving parts was known for every pass. Since, however, the engines can utilize some of this energy to complete the rolling, the

full total was not deducted, but only about 40 per cent. It may be remarked that the deduction only amounts to approximately 7 per cent. of the energy used for rolling. It can be seen from the back pressure diagrams, some of which were considerably larger than those reproduced, that the rolls were often at full speed when the piece left them, and that, consequently, the whole momentum had to be destroyed by back pressure.

The values obtained by this method are plotted in Fig 5, the abscissæ representing the elongation of the

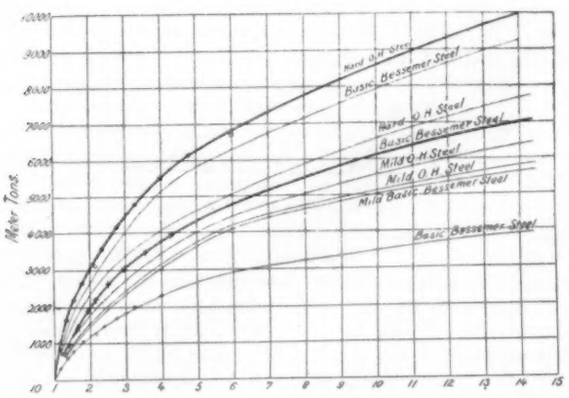


Fig. 5.—Work Performed in Rolling 2.2-Ton Ingots.

piece in the various passes, and the ordinates the work of rolling in meter tons. The curves show the variations in work required by the different classes of steel. The considerable variation with steel of the same class is due to differences of temperature. The two curves shown by heavy lines are those which were used for calculating the power required.

In designing the electric drive for a blooming mill there are two important points which must be decided upon: Firstly, what mechanism shall be employed for starting and stopping, since reversing gears cannot be used for such powers; and, secondly, how shall the variations in load be balanced, as variations which may exceed 6000 horse-power cannot be carried by the generating station. Both problems are satisfactorily solved by Ilgner's system, hitherto principally used for mine hoisting engines. It consists of installing between generating station and motor a motor generator set coupled to a very heavy fly wheel. The driving motor of this set is arranged for whatever current is generally in the power house, but the dynamo is always built for direct current. The mill

Fig 6.—Current Diagram of an Electrically Driven Ilgner Hoisting Engine.

motor is driven direct from the latter, and by simply regulating the small shunt current the voltage of the so-called starting dynamo is raised or lowered. If it is raised the speed of the mill motor increases; if lowered, an electric breaking takes place because the motor is forced to decrease its speed, and thereby transmit energy through the dynamo into the attached fly wheel. This interposed transformer not only obviates the necessity of a starting resistance and permits an electric breaking, but also keeps the large variations in load in the secondary system away from the primary station and circuits. Variations in load are carried by the fly wheel, and the converter dynamo works with a practically constant load. The degree to which the load can be balanced is shown in Fig. 6, which reproduces a current diagram taken on a large mine hoist during five successive drafts. Each draft starts with a current running up to nearly 2000 amperes, sinking to 1000 amperes as soon as the normal hoisting speed is reached. When stopping a negative current running up to 1000 amperes is shown, after which a positive current is again needed to bring the cage into position. Such movements are repeated twice at each draft, but with less current, corresponding to the different levels at which the cage stops. The second curve, which has been drawn in, shows the fluctuations of current in the driving motor of the transformer, and its regularity shows that the fly wheel balances not only the positive, but also the negative currents. The wheel weighs 42 tons, and at 375 revolutions per minute has a circumferential speed of 240 feet per second. The results obtained on this machine justify the application of the system to reversing mill practice.

The time taken to reverse is a very important factor in a reversing mill, and sometimes as many as eight passes a minute are made, and it must therefore be possible to stop and start with that frequency. Experience has proved that this can be done. In order to make the starting period as short as possible, not only must the starting dynamo of the transformer be constructed with that end in view, but also the driving motor in the mill, which principle is carried out by giving thereto the smallest possible moment of inertia. For this reason the armature must not have too large a diameter, but the motor should rather have a wide face or even be divided into two motors, whereby the moment of inertia ($G D^2$) is decreased. It will be found that motors designed on these principles have moments of inertia differing but slightly from that of the large gear generally used between steam engine and reversing mill. It may also be remarked that the moment of inertia of the rolls and mill pinions about equals that of the gear just mentioned or of the motor.

It is taken for granted that the motor will be coupled direct to the rolls. The latter will have a maximum speed of 60 revolutions per minute, which for so large a motor is fairly favorable. If gearing were introduced, the motor would be but little less expensive and the whole installation more so, while the moment of inertia would be three or four times as much. The motor must be carefully constructed to stand hard usage. That there is but little danger of harm to the winding has been shown when dealing with three-high mills. Shocks in the direction of the center line of the rolls must be allowed for in designing the couplings and the armature bearings. These and also the bed plate of the motor must be sufficiently massive to take up all strains, which, however, is equally true when a steam engine furnishes the motive power.

NOTE.—Herr Koettgen closes his paper with an elaborate calculation of the relative cost of driving a blooming mill producing 300,000 tons a year electrically as against the present method. His conclusion is that the electric installation would pay for itself in a very short time. Owing to the totally different conditions prevailing in Germany and America, this calculation would probably prove of but little value to readers of *The Iron Age*, and is therefore not reproduced.

At the annual meeting of the stockholders of the General Electric Company held in Schenectady, N. Y., May 10, the old Board of Directors was re-elected. After the annual meeting a special was held, and the proposition to increase the capital stock by the amount of $3,325,500 was adopted. The present capital stock is $45,000,000.

The Strong, Carlisle & Hammond Company, Cleveland, Ohio, have opened a branch office at 844-846 Majestic Building, Detroit, Mich., with H. H. Boggs as manager.

The Philippine Iron and Steel Trade.

WASHINGTON, D. C., May 17, 1904.—The Statistical Division of the Bureau of Insular Affairs of the War Department has prepared a summary of the imports into the Philippine Islands during the calendar year 1903 as compared with 1902. The figures of the metal schedule are of special interest, for while an increase of approximately 10 per cent. is shown in the aggregate importations in 1903, a decline appears in the total imports from the United States. Germany and Great Britain have made nearly all the important gains recorded. The items in which the imports from the United States have increased include steel rails, steel sheets and plates, castings, miscellaneous cutlery, wire nails, pipes and fittings, scales and balances, firearms, electrical machinery, pumps, sewing machines, locomotives, stationery engines, boilers and detached parts of machinery.

Decline in Imports from United States.

The total imports of iron and steel and manufactures thereof in 1903 were valued at $2,102,915, as compared with $1,909,679 in 1902, an increase of $193,236. The share of the United States in this trade in 1903 was $473,335, as compared with $476,913 in 1902, a loss of $3578. The largest single item in this schedule in the imports of 1903 was iron sheets and plates, which amounted to $288,788, as compared with $195,167 in 1902. Almost the entire importations in both years were received from Great Britain. The next largest single item in 1903 was steel rails, amounting to $159,528, as compared with $1896 in 1902. Germany supplied nearly one-half the total in 1903, Belgium furnished about 40 per cent., and the bulk of the remainder came from the United Kingdom, the United States supplying $3766 worth. Another important increase in the imports in 1903 is of structural iron and steel, which aggregated $71,108, as compared with $35,454 in 1902. The United States contributed only a few hundred dollars' worth, and nearly 90 per cent. was furnished by Great Britain in both years.

An important increase in the imports of electrical machinery was recorded in 1903, the total value being $15,560, as compared with $3530 in 1902. By far the larger part of this machinery came from the United States in both years. There was a material increase in the imports of pumps in 1903, the total being $19,013, as compared with $17,184 the previous year. The United States furnished the larger portion, amounting to nearly $12,000, in both years. The imports of sewing machines in 1903 aggregated $142,851, as against $126,166 in 1902. The share of the United States rose from $25,365 in 1902 to $30,449 in 1903. Germany furnished practically all the sewing machines not supplied by the United States.

Railroad Development.

The important increase in the imports of iron and steel rails foreshadows considerable activity in railroad building in the islands in the immediate future. In this connection the forthcoming summary of the Insular Bureau from which the above figures are taken will contain some interesting observations with regard to the granting of railroad franchises in the Philippines and a brief statement as to the most promising propositions now under consideration for the location of lines for which preliminary surveys have already been made. It is announced that while the Philippine Commission desires by every possible means to encourage the coming of American capitalists, its duty to grant the necessary franchises for railroad and other constructive enterprises with the least possible delay may result in the use of capital from other sources than the United States. English and Belgian promoters have so far controlled the field, and the people of the islands are now anxious for the introduction of American capital. It is stated that the owners of the railway from Manila to Dagupan, a line of 120 miles in length, originally built by the Spanish, but later purchased by English capitalists, and which is at present the only railroad in the archipelago, have already accepted two franchises for the construction and operation of branches, one of 25 miles and another of 531 miles. These parties are anxious to secure additional privileges extending their railway in other directions. In this connection the civil governor is reported as making the following statement:

> Reluctance on the part of American investors will certainly lead to the acceptance of these propositions. It seems to me that this much ought to be said by way of warning American investors that when later on they shall come into the islands and find foreign capital strongly intrenched in many profitable enterprises they will have only themselves to blame for the failure to seize the opportunity when it is offered them.

Government Aid for Railroads.

Referring to the policy of the Philippine Commission in granting franchises for the construction of railroads, the report says:

> Legislation is being considered by Congress which provides that the Government of the Philippine Islands be authorized to guarantee an annual income of not exceeding 5 per centum upon capital invested in the construction and equipment of railroads in the islands, the guaranty to be in such form and under such conditions that public interests may be safely guarded; the act will also prescribe rules for ascertaining the capital invested and the net income on the same, as well as fix the limit of invested capital to which said guaranty shall apply, and provide for Government supervision of the conduct of the finances of the road, location, construction and maintenance. The bill further provides that the guaranty may be made in the form of interest on bonds or of income on preferred or common stock, or in such other form and under such terms and conditions as may be determined and approved by the Philippine Government, provided that the total annual contingent liability of the insular government under the guaranties authorized shall not at any time be in excess of $1,500,000, and that no guaranty shall continue for a longer period than 30 years. Free importation into the islands of material for the construction and equipment of such railroads is provided for, and it is hoped that when final action is had the measure will prove of substantial benefit to the commercial development of the islands.
>
> With a view to the possible adoption of a plan for the construction and operation of railroads in the islands the Philippine Government has had preliminary surveys made of several lines.

W. L. C.

The Leschen Wire Rope Works.

The A. Leschen & Sons Rope Company have just completed the erection of probably the largest wire rope factory in the country, on 31 acres of ground, between Hamilton and Hodiamont avenues, in the northwestern part of the city of St. Louis. Their plant is equipped with the most modern machinery of all kinds, and the ropes which they are manufacturing they are selling and shipping at the present time to all parts of the world, as well as to all parts of this country. Their rope is used in the elevators of the largest buildings in every city in this country and is found in use in mines, in quarries, on derricks, in the logging camps throughout the country and on aërial wire rope tramways, which the A. Leschen & Sons Rope Company are building in very large numbers.

It was not very long ago that they completed an aërial wire rope tramway in Wyoming between 16 and 17 miles in length, on which alone almost 70 miles of wire rope was used. This tramway material they manufacture in their new machine shop and blacksmith shop which they have erected on their property.

The business was founded in 1857 by Adolph Leschen. In 1872 it was changed to A. Leschen & Son, when Henry Leschen became a partner with his father. In 1886 the corporation of A. Leschen & Sons Rope Company was formed, of whom Henry Leschen is president.

Dr. Richard Moldenke, secretary of the American Foundrymen's Association, announces that the convention headquarters, June 7 to 9, will be at Hotel Claypool, Indianapolis, where the following rates prevail: American plan, $3 to $5 per day; European plan, $1.50 to $3.50 per day. As there is another large convention announced for the same dates, it is advisable that rooms be retained as early as possible, so that the entire party may be housed under one roof. Some twenty papers are promised for the convention, covering a wide range of subjects, and these and the numerous points to be discussed would indicate an unusually valuable gathering. Provisional programmes will be issued shortly.

The Iron Age

New York, Thursday, May 19, 1904.

DAVID WILLIAMS COMPANY, - - - - - - - - PUBLISHERS.
CHARLES KIRCHHOFF, - - - - - - - - - EDITOR.
GEO. W. COPE, - - - - - - - - - - ASSOCIATE EDITOR.
RICHARD R. WILLIAMS, - - - - - - - - - HARDWARE EDITOR.

The Fluctuating Demand for Iron and Steel.

The ideal condition of the iron trade would be a steady demand for the entire output of every plant, with a narrow range of prices. All vexatious problems would then be eliminated. Wages schedules would be unvarying, labor troubles would be few, producers could make their arrangements for raw materials with confidence and consumers could safely figure on their operations far into the future. But such a beatific state was only known in primitive times. With the widespread use of iron, and the enormous increase in its production, rapid fluctuations in the demand have grown to be a fundamental peculiarity of the trade. The market for almost any other staple is now much more uniform than the market for iron. This is unavoidable because of the uses of the commodity. No other product enters so universally into the necessities of mankind as iron. The forces of civilization are dependent upon it. Every advance in engineering methods widens its adaptability. Progress in the arts is almost always attended with some new use of it.

It might be assumed that the universal dependence of mankind upon iron would steadily increase its consumption and thus cause the demand to grow more staple, but this widespread use is at the same time the cause of the fluctuations in the demand which are often so disconcerting. During times of prosperity everything contributes to increase the consumption of iron. Railroads need more rails, cars and locomotives, and they build more bridges and warehouses. Implement manufacturers turn out more farm machinery. Factories of all kinds expand and purchase increased quantities of equipment. Municipalities enter upon great schemes of local improvement: public service corporations multiply, and their needs are felt in many branches of the iron trade. Building operations are active, involving a demand for various forms of iron. The purchasing power of the masses increases, and among the supplies they desire much is found into which iron enters. Even the pleasures of the people cause heavy investments in providing for their amusement, involving drafts upon the iron trade. We have gone through just such an experience in the last five years. The consumption of iron grew by leaps and bounds as a result of the exuberant prosperity with which this country has been favored. But to sustain the consumption on such a high plane it would be essential that the prosperous times should continue unabated and that capital should be seeking fresh enterprises on a more liberal scale. In the nature of things this is not to be expected. We now see a halt in the march of progress. Railroads are curtailing their expenditures, the building trade is much less active, new enterprises can no longer attract capital freely, employment is not so eagerly seeking labor, and the purchasing power of the great body of people has diminished. Therefore a shrinkage in the demand for iron is perceptible as a result of the general curtailment of business operations.

A most interesting illustration of the manner in which the demand for iron and steel fluctuates is made by taking the approximate figures for the monthly consumption of coke and anthracite pig iron since the beginning of 1903. The following table is compiled by taking our figures for the monthly production of coke and anthracite iron, adding the importations for the month, subtracting the exports and allowing for changes in stocks during the month:

Monthly Consumption of Coke and Anthracite Pig Iron.

	Consumption. Gross tons.	Increase on previous month. Gross tons.	Decrease on previous month. Gross tons.
January, 1903	1,472,788	.....	.....
February	1,474,439	1,651	.....
March	1,636,235	161,796	.....
April	1,716,702	80,467	.....
May	1,737,078	20,376	.....
June	1,699,689	.....	37,389
July	1,519,898	.....	179,791
August	1,568,645	48,747	.....
September	1,478,112	.....	90,533
October	1,352,819	.....	125,293
November	1,003,897	.....	348,922
December	857,509	.....	146,388
January, 1904	951,635	94,126	.....
February	1,252,939	301,304	.....
March	1,547,825	294,886	.....
April	1,567,560	19,735	.....

* Imports and exports are not taken into consideration for this month, as the figures have not yet been published.

This table shows how remarkably the consumption can fluctuate in a very brief period. It fell, for instance, from but little short of 1,750,000 tons last April to only 857,509 tons in December, swelling again to over 1,500,000 tons in the past month. It is not usual for the change in the demand to be so violent, but nevertheless changes of a somewhat similar character quite frequently occur. These changes cannot be ascribed to any other than natural conditions. They occur wholly irrespective of tariffs or trusts, or high or low prices for iron, and whether venturesome spirits are inclined to overspeculate or not. Let large consumers of iron in a few branches of trade diminish their purchases because of a lessened demand for their products, and a great gap is forthwith created in the iron trade, which cannot immediately be filed by a stimulated demand from other quarters. Movements of this character can no more be controlled than the regulation of the supply of rain or the duration of sunshine. The only way in which fluctuations in the demand could be checked would be through the stoppage of the further development of schemes for improvement or expansion in all transportation, manufacturing and business interests generally. It would be necessary that absolutely no change take place in methods or processes. In no other manner would it be possible to secure a steady and undeviating demand.

The Deadlock in Lake Traffic.

In its essence the controversy that is now tying up the freight traffic on the great lakes is the question whether boats shall be run on the closed or open shop principle. Year by year the unions, embracing all classes of labor on the lake vessels, have grown in strength, and, taking advantage of the necessities of the vessel owners, have demanded and secured one advance after another in wages, and one restriction after another in the service to be rendered, until conditions have become well nigh unbearable. Things came to the pass when a drunken stevedore or coal passer could not be discharged without running the risk of precipitating a strike that would tie up the whole vessel, and freight steamers came to be the worst type of closed shops under union domination.

This year the owners succeeded in making settlements with five of the six unions involved, and were about to take up the season's work when the Masters' and Pilots' Association, consisting of about 2000 captains of vessels, issued a series of demands so revolutionary in

character that the owners concluded that further yielding to organized labor was business suicide. Among the demands made by the captains, in addition to a large increase in pay, was an agreement that the moment "three bells" were rung as a signal for the first stirring from winter moorings the captain who gave the signal was under control for the full season and could not be discharged without the consent of the unions unless a full season's pay were given him. The captains also demanded that they be given the right to employ and discharge all help on the boat, which would mean that a nonunion man could not cross the gang plank.

Time was when the captain of a vessel, and the engineer, too, for that matter, was considered a direct representative of the interests of the owner, and the every effort of these officials was to make runs that would bring profit to the owners. This is still true with a large number of captains who to-day own an interest in their boats, but so strong has the union element become that these owner-captains themselves have been forced to join the Masters' Association or they could not get even a cook to serve for them. And to-day these very captains, because they are in a minority, are forced to sit idly by and see the property in which their savings have been invested lying idle and piling up dockage and other costs without return. The stand taken by the striking captains throws out of work a large number of men directly and injuriously affects others, such as dock laborers, tug men, coal and ore miners and shippers.

The tying up of the vast commerce of the lakes is no small matter, and the seriousness of the situation becomes more apparent each week of the deadlock. Yet the owners believe that the time has come for them to make a last stand, in the hope of regaining some measure of control and authority in properties which are of such vast financial and commercial importance.

In the case of a strike on the part of subordinates it is possible for owners to run at least a few of their vessels with nonunion crews, but the captains hold the key to the situation in their possession of Government licenses and in the maze of Government restrictions which hedge about and protect such licenses. Even if vessel owners should be able to promote first and second mates, who possess the necessary experience, to the mastership of their vessels, the next move on the chess board would be for these men to be forced into the Masters' Association under the penalty of the same threats that forced so large a percentage of the captains into the unions against their will in the first place.

Unless the Government authorities themselves step in and give relief to the owners, prospects are that lake navigation for the summer of 1904 will be a negligible quantity, and Buffalo, Cleveland, Detroit, Chicago and other ports will suffer the loss of a commerce which represents a very large percentage of their commercial activities. Small relief is being offered by the railroads, which are now carrying freight to and from Chicago and the seaboard at the lake and rail rate, but this can by no means offset the loss of the lake carrying trade.

The Allis-Chalmers Company's Big Water Tank.—The Allis-Chalmers Company are having erected at their West Allis works, Milwaukee, what is said to be the largest elevated steel water tank ever built for a private concern. It is to form a part of the fire protection system, and will connect with the sprinkler apparatus recently installed throughout the buildings. The tank is 22 feet in diameter and 28 feet high, and will hold 100,000 gallons of water. The bottom of the tank is shaped like the bottom of a kettle, instead of flat, thus doing away with all dead pressure. A 10-inch pipe connects the tank with the sprinkler pipes. A steel coil encircles the superstructure, and jets of steam can be forced into the tank from the boiler house in the winter, to prevent freezing. The Chicago Bridge & Iron Works have the contract for its erection. Its extreme hight of 164 feet above the ground level, added to the 148 feet elevation of the plant itself, makes the new structure visible for miles in all directions.

CORRESPONDENCE.

The Kennedy Tight Top Furnace.

To the Editor: In your issue of May 5, Frank C. Roberts of Philadelphia, discussing furnace top explosions, says: "It is hoped that the views herein expressed will result in a full and free discussion of the matter, and lead to conclusions which will enable the furnace manager to prevent, or at least control within limits, the conditions producing these explosions."

After enumerating three supposed causes—namely, admission of air to space above the stock, the deposition of carbon, and the formation of an explosive mixture owing to the absence of sufficient limestone in the burden—he disposes of the first hypothesis in a satisfactory manner, names the second as that which is most generally held by furnace managers, and gives some very interesting observations with reference to the third. But under the heading "Experiments to Control or Prevent Explosions" he says: "Much has been claimed for the 'tight top furnace'—*i. e.*, one which is air tight and without explosion doors, the whole being built to withstand the pressure of explosion."

This is true except that the heading is wrong, as a tight top furnace is no longer an experiment; and when he says that "this device is predicated upon the explosion being due to the admission of air to the furnace top" he shows a surprising lack of information with reference to the "experiments" referred to.

Julian Kennedy of Pittsburgh designed and built for the Iroquois Furnace Company at South Chicago a tight top shell as much as two or three years ago, and since that time has built others of the same style, so that, if he were but granted an ordinary amount of experience and information respecting such matters, which is far from the case, it would seem to have passed beyond the experimental stage, not only with him but also with his clients.

The theory of the tight top depends upon the control of such pressure as generally results from the second hypothesis—viz., the arching of the furnace from a deposit of carbon at some point above the fusion zone. Before this arch gives way the burden is supposed to have been burned away or reduced to such an extent below that when the unburned stock does find its way to a lower plane the blast which has been accumulating beneath the arch, in what may be considered as a kind of a reservoir, becomes at once subjected to the additional pressure of the descending volume of superimposed stock. Its pressure runs up and when it finds an opening, such as an explosion door or a bleeder, it streams out very much as the gas does from a champagne bottle, carrying the stock with it.

These "slips" show absolutely nothing of an explosive character; there is no detonation and the gradual increase of the discharge is exactly what might be expected from such a theory.

Mr. Kennedy reasoned that this temporary rise in pressure was not dangerous to handle; and if any one will figure for a moment on the area of the furnace top, and the weight of the ordinary loose plates which cover the same, he will see how little additional resistance is required to accomplish his purpose.

For the past year my work has kept me within full view of six blast furnaces provided with explosion doors and running on Mesaba ore, so that the phenomenon of a blast furnace "slip" is no curiosity to me, and so far as my observation goes, Mr. Kennedy's theory leaves nothing to be desired in the way of additional investigation.

The "tight top" confines the rising blast and gas pressure and compels it all to leave the stack by way

of the downcomers. It is a great step in advance by the greatest of our blast furnace engineers, and it deserves more consideration than Mr. Roberts' article would seem to indicate that it was entitled to.

ENOS L. MOORE.

CHICAGO, ILL., May 16, 1904.

Segregation and Diffusion in Steel.

BY B. F. WESTON, MONESSEN, PA.

Among the many problems and conditions which confront the iron and steel metallurgist there is none of greater importance than the parts played by segregation on the one hand and diffusion on the other. It is within the last 30 or 40 years that segregation in steel has attracted attention, and it is believed to have been the cause of failure of important parts of machines and structures, thus endangering life and causing loss of time and money. It is an ever present condition which producers do not like to hear much about; although, when necessary, they admit its existence. Steel makers need not feel entirely at fault if cases of segregation do occur in their practice, for the conditions producing this undesirable quality seem to be rather well fixed by natural laws, over which the cunning of man has not yet triumphed. It would be unwise to say that man will never trimuph, for the writer is a firm believer in the old adage, "Where there's a will there's a way."

To the one making a study of steel and iron there is an ever increasing interest in their various and intricate phenomena; many of which are explainable by natural laws, and only needing the perception of a master mind to lay them before us, when we are surprised at the almost perfect analogy existing between two things apparently so entirely different.

We need not look to steel and iron to furnish all the cases of segregation, for the same conditions producing this effect are at work in other metals, with, perhaps, not quite so disastrous results, but they are there, nevertheless. One need only to examine a very few polished and etched specimens of steel or of other alloys to be struck with the regularity with which the various metals and metalloids arrange themselves according to the given conditions, and also to note how a small change in conditions produces such different effects.

The Principle of Segregation.

Thus by the aid of the microscope we are enabled to detect the segregation of even the microscopic constituents of steel which is perfectly homogeneous, while chemistry enables us to detect the true cases of segregation. In order that all may understand fully the meaning of the terms segregate and segregation, we find that Webster defines segregate, "To separate from others, set apart," while a committee appointed by the council of the Iron and Steel Institute, in a glossary of terms defines segregation as, "A term applied to the more fusible parts of metals and alloys which are last to freeze, and are driven into certain local centers by the metal which first crystallizes. Segregates are generally found near the centers of the castings, and are most pronounced in very large masses." Taking it for a settled fact that segregation exists, a fact which no engineer or well informed worker or producer of iron or steel doubts, it will be interesting to study some of the phenomena connected with this condition.

To illustrate, let us take an ingot which has just been poured; let us assume that all the metals and metalloids are in solution in the molten iron and that the steel is perfectly homogeneous. While the ingot was being poured cooling has been taking place at the bottom and sides of the mold, while the center of the ingot is still molten, which, in the modern practice of pouring large ingots in order that the steel may receive sufficient work in producing a large finished piece, will take some time to solidify. Howe says, "There is the struggle between crystalline force and surface tension, aided by gravity on the one hand, tending toward differentiation, and of diffusion on the other, tending toward uniformity." During the cooling, which will evidently be slow, sufficient time is given for the freezing of some compound of some of the elements present, which by thus freezing expels a more easily fusible constituent, which, perhaps, being lighter, will naturally work toward the top of the ingot, and there unite with some element for which it has some affinity and there form a segregate.

It seems quite evident that the segregrate must and does have a different composition from the rest of the mass, else it would not have segregated. It may be composed of those elements which have a strong affinity for each other, are lighter or perhaps are more fusible, and as the segregated part is generally found in the upper and central part of the mass, which is the last to solidify, it is very probable that the segregate has these properties, and it is true of at least three of the elements which segregate most. Fortunately there is at work the law of diffusion, whose action is in opposition to that of segregation, and which has a corrective tendency through the redistribution and equalization of the various elements, some of which are probably more affected than others, as long as the metal is sufficiently hot to permit of this diffusive action. Rapid cooling has the effect of checking very largely the segregation of the elements present, but it also has a restraining tendency on the equalizing action of diffusion. While the diffusive action tends toward the final production of a more homogeneous metal, it is far from overcoming the heterogeneousness produced by the segregating action, which is seen by microscopic and macroscopic (visible to the naked eye) examination; and, indeed, the microscopist will need to exercise care in the examination of samples for microscopic segregation lest shadings may be produced in the process of preparing the sample that may be mistaken for segregation.

The Principle of Diffusion.

The principle of diffusion is almost akin to that of cementation of steel, in which the carbon is added to the iron by an intermolecular penetration at a high temperature in the latter case, whereas in the former the carbon tends to diffuse in the same manner from one part of the freezing and cooling mass to another. Having thus spoken of the beneficial and equalizing action of diffusion, let us return to our frozen and cooling ingot, and see under what theoretical conditions it may contain the least possible final segregation.

We have already seen that during freezing segregation takes place, and, after freezing, diffusion; from this we may infer that an ideal method would be to cool the ingot rapidly to the freezing point of the metal, thus lessening the tendency to segregation; then to cool very slowly from this point, and within the range in which the diffusive or equalizing action will take place. This *modus operandi* would seem to be particularly desirable with large masses, in which the greatest segregation undoubtedly takes place, while in small ingots a minimum of segregation is developed. This being true, we very naturally infer that the more homogeneous steel will be obtained when pouring small ingots, and we may infer that the rapid freezing is more potent in producing homogeneous steel than the subsequent diffusive action.

Since there is evidence that this diffusive action does take place, it is natural to ask, what elements have this property, and do the same elements have the tendency to segregate? From the general nature of things we would expect the migratory elements to either segregate or diffuse, and from the literature at hand this is found true with respect to carbon, phosphorus and sulphur, while with regard to manganese and silicon there seems to be a conflict of data. Analyses consulted indicate that manganese and silicon are segregating elements, while an experiment mentioned later indicates that they are fixed. There is some evidence that the supposed segregation of manganese was rather imperfect mixing of the recarburizing alloy.

Extreme Cases of Segregation.

The following are extreme cases of segregation that have been selected from various sources, and are suggestive of what may occur and has occurred. The 11 cases cited below are selected from a table in Howe's masterful work on steel, and in which over 60 cases are given. The summary is given of that number:

Description.	Carbon. Mother metal.	Segregation.	Difference.	Silicon. Mother metal.	Segregation.	Difference.	Manganese. Mother metal.	Segregation.	Difference.	Phosphorus. Mother metal.	Segregation.	Difference.	Sulphur. Mother metal.	Segregation.	Difference.
Tee rail	0.686	0.865	+ 0.179	0.041	0.041	0.000	0.91	0.915	+ 0.005	0.088	0.124	+ 0.036	0.146	0.217	+ 0.071
Bad rail	0.385	0.513	+ 0.128	0.026	0.023	—0.003	1.056	1.131	+ 0.075	0.130	0.207	+ 0.077	0.059	0.119	+ 0.060
Broke rail testing	0.250	0.70	+ 0.45	....	....	....	0.97	1.22	+ 0.25	0.0728	0.35	+ 0.277	....	....	....
Tee rail	0.333	0.445	+ 0.112	0.028	0.028	0.000	0.755	0.892	+ 0.137	0.081	0.126	+ 0.045	0.029	0.06	+ 0.031
Bad rail	0.301	0.393	+ 0.092	0.034	0.031	—0.003	0.71	0.853	+ 0.143	0.145	0.231	+ 0.086	0.038	0.079	+ 0.041
Bad rail	0.31	0.60	+ 0.29	0.089	0.089	0.000	0.684	0.792	+ 0.108	0.1092	0.2856	+ 0.1764	....	....	....
Ingot	0.19	0.30	+ 0.11	....	....	....	....	....	....	0.048	0.074	+ 0.026	....	....	....
Ingot 90 inches long	0.37	0.92	+ 0.55	0.006	0.043	+ 0.037	0.498	0.535	+ 0.037	0.096	0.261	+ 0.165	0.025	0.161	+ 0.136
Ingot 7 feet long	0.44	0.77	+ 0.33	....	....	....	0.514	0.558	+ 0.044	0.052	0.142	+ 0.090	0.040	0.187	+ 0.147
33-inch steel roll	0.68	1.20	+ 0.52	....	....	....	0.690	0.840	+ 0.150	0.074	0.100	+ 0.026	....	....	....
19-inch shaft	0.452	0.898	+ 0.446	0.106	0.123	+ 0.017	0.69	0.818	+ 0.128	0.059	0.139	+ 0.080	....	....	....
Summary.															
No. of + cases		34			23			32			44			32	
No. of — cases		17			12			20			13			15	
No. of 0 cases		3			11			1			2			0	
Maximum + case		+ 0.550			+ 0.221			+ 0.250			+ 0.2772			+ 0.192	
Maximum — case		— 0.065			— 0.055			— 0.130			— 0.019			— 0.015	

The following data, also taken from Howe's work, are very instructive and furnish practical proof of the present theory of segregation. The figures given are carbon percentages at different points in the vertical section of a large ingot:

Top of ingot.						
0.24	0.28	0.24	0.30	0.28	0.23	0.26
0.26	0.36	0.64	0.50	0.57	0.38	0.27
0.30	0.39	0.51	0.78	0.49	0.42	0.30
0.29	0.36	0.40	0.72	0.40	0.42	0.29
0.32	0.38	0.35	0.43	0.34	0.38	0.33
0.31	0.33	0.31	0.32	0.30	0.30	0.32
0.33	0.27	0.28	0.29	0.28	0.27	0.29
0.33	0.25	0.26	0.24	0.25	0.26	0.30
0.34	0.24	0.25	0.22	0.24	0.24	0.33
0.32	0.23	0.23	0.22	0.23	0.24	0.29
0.32	0.25	0.25	0.24	0.26	0.26	0.30
0.28	0.28	0.30	0.29	0.30	0.29	0.28
Bottom of ingot						

The writer does not wish to be thought entirely pessimistic on the subject, but wishes merely to call attention to the possibilities of the case, and while with reasonable care ingots of moderate size may be free from harmful segregation, it is very probable that under certain conditions steel may be very harmfully segregated.

Diffusive Results.

The preceding examples clearly indicate the segregating tendency of carbon, phosphorus, sulphur and, probably to a less extent, manganese and silicon, and it is reasonable to suppose that the same elements will also diffuse. That carbon, phosphorus, sulphur, as well as nickel, have this self regulating property to a degree is well proven by the elaborate and painstaking research of Arnold and McWilliam, who procured cylinders of nearly pure iron, nearly 3 inches long and 0.7 inch in diameter, through which a hole 0.35 inch in diameter was bored. These were fitted with bars of iron containing about 1.5 per cent. of the elements whose diffusive action was to be determined. These compound bars were then heated in vacuo for about ten hours at a temperature between 950 and 1050 degrees C. When cold, the pieces were turned down in a lathe until a layer about 1-25 inch remained on the core. This portion was then turned off and analyzed. In the table below is given the diffusive power of four of the 11 more common elements in steel at the given temperature:

General Table of Diffusive Results.

Elements.	Original per cent. in jacket.	Original per cent. in core.	Per cent. in the 1-25 inch of jacket adjacent to core after experiment.	Percentage diffused in ten hours.
Migratory:				
Carbon	0.05	1.78	0.55	0.50
Sulphur	0.02	0.97	0.12	0.10
Phosphorus	0.015	1.36	0.11	0.095
Nickel	0.00	1.51	0.11	0.11
Fixed:				
Manganese	0.05	1.29	0.04	None.
Silicon	0.027	1.94	0.028	None.
Chromium	0.00	1.10	0.00	None.
Aluminum	0.02	1.85	0.02	None.
Tungsten	0.00	1.41	0.00	None.
Arsenic	0.02	1.57	0.012	None.
Copper	Trace.	1.81	Trace.	None.

Taking into consideration the high reputation of the authors, there seems little room for doubt of the accuracy of this work. They also seem to have conclusively proved that these migratory elements do not diffuse as elements, but as a definite iron compound—*i. e.*, carbon as a carbide, sulphur as a sulphide, and phosphorus as a phosphide of iron—and it is well known that such compounds are recognized in the chemistry and physics of steel.

Variations in Carbon at Different Depths.

Some months ago tests of basic open hearth steel of 0.40 to 0.60 per cent. carbon were taken in a sectional cast iron mold about 5 inches high, 1.75 inches square at the bottom, and about 2 inches square at the top, inside dimensions, thus giving a test piece of about these dimensions. About 2 inches from the bottom a fillet was cast in the mold, in order to give a test piece easily broken. The wall of the mold was ½ inch thick. Several of these tests were taken, and when determining the carbon content by color widely different results were obtained, using drillings from different depths. Thinking the discrepancy caused by the unequal rate of cooling between the outside and center, combustions were made on several samples, using the drillings taken from the surface after removing the scale by drilling, and also the drillings from as near the center of the piece as possible. The pieces frequently had a large central cavity, into which the drill would penetrate. The following are the results obtained in determining carbon by color and combustion:

	Surface. Color.	Center. Color.	Difference.
No. 2,092	0.54	0.63	0.09 +
No. 2,094	0.38	0.43	0.05 +
No. 2,095	0.62	0.70	0.08 +
No. 2,097	0.47	0.55	0.08 +
No. 2,098	0.48	0.50	0.02 +
No. 2,163	0.58	0.67	0.09 +
No. 2,056	0.58	0.66	0.08 +

	Surface. Color.	Surface. Combustion.	Center. Color.	Center. Combustion.	Difference.
No. 2,142	0.51	0.53	0.63	0.62	0.09 +
No. 2,168	0.57	0.61	0.66	0.69	0.08 +
No. 2,025	0.60	0.62	0.75	0.76	0.14 +
No. 2,042	...	0.51	...	0.55	0.04 +

Owing to the small amount of drillings, as well as the lack of time, no attempt was made to determine other elements, which it is hoped may be done at some future time. These results show that between the outside and center of these test pieces, a space of about ⅝ inch, there is a variation in the carbon content of 0.02 to 0.14 per cent. carbon, and it is observed that the greater differences are in the higher carbon samples. It is hardly to be expected that such differences would be found in so small amount of rapidly cooled steel.

The third annual convention of the International Railway Master Boiler Makers' Association was opened in Indianapolis on May 17, to be continued three days. Among papers read at the convention were: "Progressive Tools for Boiler Shop Work," W. A. Timms; "Fire Box Templates Accompanying Delivery of Boiler from Locomotive Works," W. H. Shaw; "Proper Methods of Building Boilers, Applying Fire Boxes in All Its Form," J. R. Cushing; "Best Kind of Tank and Construction of Same," John McKeown.

MANUFACTURING.

Iron and Steel.

Zug & Co., Limited, Pittsburgh, manufacturers of the Sable brand of black and galvanized sheets, are operating their mills to full capacity and have considerable tonnage booked.

The Griffiths Charcoal Iron Mills, Washington, Pa., are building a furnace, 9 x 23 feet, for reheating knobbled charcoal blooms, and will install a new 250 horse-power water tube boiler. When these improvements are completed the plant will have an output of about 27 tons of charcoal iron per day.

The Waynesburg Forge, Sheet & Tin Mills, Waynesburg, Pa., manufacturers of black plate for tinning and black sheets, will install a galvanizing department for making galvanized sheets.

The New Castle Forge & Bolt Company, New Castle, Pa., have authorized a bond issue of $75,000.

The Chicago Steel Mfg. Company, who lost their plant at Hammond, Ind., through fire in December of last year, are erecting a new steel covered factory at Newcastle, Ind., which will be about 170 feet wide by 225 feet long. The capacity of this building is expected to be about 750 kegs of nails per day. A complete plant for making agricultural shapes will also be installed. It is expected that the new buildings will be in operation by July 1.

The Republic Iron & Steel Company resumed work May 9 on several puddling furnaces at their Muncie, Ind., plant, giving employment to 150 additional men. These furnaces had been idle during the winter owing to a scarcity of natural gas.

At a meeting of the Buffalo & Susquehanna Iron Company, Buffalo, N. Y., held May 12, the following directors were elected: William A. Rogers, Frank H. Goodyear, Charles W. Goodyear, Hugh Kennedy, and S. M. Clement.

A very large tract of land in McKeesport has passed into the possession of the United States Steel Corporation. All the ground included is situated in what is known as the Bowery section, which was purchased some time ago by the Steel Corporation for a price said to be $750,000. But one obstruction now remains to hinder the construction of their large new tube mills in McKeesport, and that is the city garbage furnace, which will be removed as soon as a new one can be secured.

A large amount of labor saving machinery is being installed in the tin house of the Monessen works of the American Sheet & Tin Plate Company, at Monessen, Pa. A large new warehouse is to be built at this plant.

The Neville Island Furnace of the American Steel & Wire Company, at Neville Island, Pittsburgh, went out of blast last week. The furnace will be idle for some time, as extensive repairs are to be made.

The Walker Works of the American Bridge Company, at West Homestead, Pa., have been removed to Ambridge, Pa., where several of the bridge plants of the company are to be concentrated. The Walker plant was the last large plant built by the American Bridge Company and was very complete. The ground occupied by the buildings has been sold to the Mesta Machine Company, whose plant adjoins the property, and who will use it for making large additions to their works.

The property of the Chickies Iron Company, including the two blast furnaces at Chickies, Lancaster County, Pa., is to be sold at auction at Lancaster on June 4, under order of the Common Pleas Court of Lancaster County. The sale is for foreclosure of the first mortgage under which the Fidelity Insurance, Trust & Safe Deposit Company are trustees. The $200,000 represented by that mortgage was scaled down by the owners of it some years ago to $100,000, the amount now due for principal and interest being $122,875. The present owners of the bonds are virtually the owners of the property, and it is to make title to them that the property is being sold. The property will, no doubt, be bought in by parties interested.

It is reported that the York Rolling Mill, at York, Pa., a dependent of the Susquehanna Iron & Steel Company, now in the hands of a receiver, will be operated this summer after months of idleness.

The Andover Furnace, at Easton, Pa., will be put in blast June 1. About 180 men are employed, and the prospect is bright for steady work.

The mills of the Pennsylvania Steel Company at Steelton, Pa., are again working full time. The bridge and construction department this week commenced the construction of a 250-foot draw bridge for the new line of the Wabash Railroad, east of Pittsburgh.

The Alabama Consolidated Coal & Iron Company, Baltimore, Md., have taken no action toward the erection of another furnace at Gadsden, Ala. A committee of the directors recently inspected their new furnace at that point, and their presence led to the rumor that another stack was to be erected. The company have ordered an additional blowing engine to reinforce the reserve power.

F. M. Baumgartner of Pittsburgh has recently completed the organization of a co-operative company among the former employees of the Zanesville Iron Company of Zanesville, Ohio, with a view to buying in the rolling mill property when it is to be offered for sale on May 24 by Master Commissioner T. F. Spangler. The property is appraised at $51,000 and must bring two-thirds of that amount. The mill was offered for sale several weeks ago, but there were no bidders. Mr. Baumgartner proposes to furnish the money to purchase the plant and the employees are to buy stock out of their wages, of which 25 per cent. is to be reserved to be paid on the stock.

General Machinery.

Charles E. Smith and Charles W. Gearing have been appointed receivers of the Angell Mfg. Company, Franklin, Pa., manufacturers of specialties in oil well supplies. An inventory has been taken which shows that the affairs of the concern are in better condition than supposed, and there is a good prospect of the creditors being paid in full. The plant is being operated with a full force, and on full time.

The Goodspeed Machine Company, Winchendon, Mass., will erect a new shop, 40 x 150 feet, in that town. The site is adjacent to the Boston & Maine Railroad. The company are at present tenants of the National Novelty Company. The lease will soon run out, which will enable them to get into a shop containing new conveniences and with better freight facilities, owing to the proximity to the railroad. They manufacture wood working machinery, such as tub, pail, bobbin and spool machinery, gauge lathes, Stimpson's dovetail machines and cylinder stave saws.

The H. B. Smith Machine Company have just completed moving their Chicago office and showrooms from 65 South Canal street to 10 and 12 North Canal street. Their new quarters, which include the store floor and basement, give them larger space than they had previously, and the advantage of a much better location.

W. J. Savage has withdrawn from the firm of Savage & Tyler, general machinists, Knoxville, Tenn., and has installed a new plant on the Louisville & Nashville Railroad for the manufacture of flour mill, marble mill and power transmission machinery and for doing general machine work. The machinery has been purchased.

The Colorado Iron Works Company, Denver, Col., who recently increased their capital stock, will probably build a new plant at Littleton, as their present shops are to be taken over by the Moffat railroad interests, who will use them as repair shops.

Business men and manufacturers of Canton, Ohio, are raising a subscription of $12,000 to secure the rebuilding in that city of the machine shops of the Wheeling & Lake Erie Railway, which were destroyed by fire last winter. The company have agreed to rebuild in Canton and spend $100,000 in improvements if the city furnishes the building site. The amount will undoubtedly be raised.

O. B. Taneyhill has sold his interest in the Kelly & Taneyhill Company, manufacturers of well drilling machinery, Waterloo, Iowa, to L. S. Parsons. Mr. Parsons for the past year has been president and principal stockholder of the company, and upon the formal retirement of Mr. Taneyhill will assume active management. Mr. Taneyhill's plans are not yet outlined for the future.

The Tabor Mfg. Company, Philadelphia, Pa., manufacturers of molding machines, report a very encouraging condition of trade, orders during the past month having exceeded all former records. Thirty-five new power squeezers, a light power substitute for the hand lever squeezer generally known to the trade, have just been ordered, 30 of which are for the hardware manufacturers of New Britain, Conn. Two large machines, one a jar ramming machine and one a power ramming split pattern machine, have been ordered for export to Brazil. Machines have also been shipped to England, and a large number have gone to the heater and pipe foundries in Utica, N. Y.

Power Plant Equipment.

The Trebert Auto & Marine Motor Company, Rochester, N. Y., who were recently incorporated, have installed a plant for the manufacture of gasoline engines for auto and marine purposes. The equipment is entirely new and consists of three large engine lathes, two drill presses, one grinder, 50 horse-power engine, one sawing machine, one large milling machine, at a cost of $1300, and all necessary cutters, shucks, drills, vises, taps, &c. The company now have their first engine complete, and will be ready to supply the market with their new 34 horse-power engine as fast as they secure orders. Arthur P. Schwab is secretary.

The William H. Page Boiler Company, Norwich, Conn., have let the contracts for a new addition to their factory, which will be of corrugated iron, one story, 50 x 130 feet, and will be used for a machine shop and mounting room. They state that the new machinery has been bought and expect the work on this addition will be commenced at once, the additional room being needed, as they are very busy on the line of boilers which they have been making for some time past.

The Harrisburg Foundry & Machine Company, Harrisburg, Pa., have commenced the erection of two large engines for the United States Government at the Norfolk navy yard, Va.

The York Engineering Company, York, Pa., have been organized with a capital stock of $25,000, to install heating and venti-

lating apparatus, electric, hydraulic and other power plants of every description. H. H. Lindemuth of Lancaster, Pa., will be president, and William H. Myers of York, Pa., secretary. At first the company will purchase machinery and apparatus required from outside firms, but later contemplate the erection of their own mills.

Plans and specifications for the improvements to the boiler house of the Charlestown navy yard's steam engineering building are ready. These improvements are estimated to cost $30,000.

The Ingersoll-Sergeant Drill Company, Cleveland, are preparing figures on the cost of sinking a number of wells and installing pumping machinery for supplying the city of Zanesville, Ohio, with improved city water supply. If the new plant is installed it is probable that the present water works station will be rebuilt and equipped as a municipal lighting plant for supplying the city lighting.

Citizens of Tiffin, Ohio, are considering the proposition of building a municipal water works plant, and a special election will be held at once to vote on the subject. The contract with the Tiffin Water Works Company has expired, it is claimed.

Foundries.

M. M. Cecil, who has charge of the property of the Heating, Ventilating & Foundry Company, located at Elm Grove, W. Va., has shut down the plant, and recommends that the property be sold at auction. He reports that the liabilities are $23,496 and the assets $5562.

The Bacon Brake Shoe Company, Spuyten Duyvil, New York, have been incorporated to sell brake shoes for cars, which are made of a special metal which is manufactured by Isaac G. Johnson & Co., New York, who are interested in the new company. The Johnson Company have been making this metal for a number of years and have had such satisfactory reports regarding the quality of the brake shoe that they deemed it advisable to organize a special company to push its sale.

Final papers have been signed whereby the Sanford-Day Iron Works, Knoxville, Tenn., have taken over the plant and business of A. Whitney & Sons Car Wheel Works, Philadelphia. The chills, patterns and various equipment of the Philadelphia plant have been shipped to Knoxville, where they will be installed in the Sanford-Day Works. This aquisition will enable the Sanford-Day Iron Works to make the largest car wheels for heavy railway service in connection with their regular line of coal mining cars, monitors, dump cars, trucks, &c. In taking up the manufacture of the Whitney mine car wheels, which have been favorably received by the trade for some time and for which large orders have already been received, the company will at first pay special attention to the production of small wheels for the mining trade, tramways, &c. Chilled castings of all kinds will also be made. A. W. Whitney, the chemist and practical wheel man of the Whitney firm, is now in Knoxville, and will have charge of the new department. James S. Whitney will retain his office in the Betz Building, Philadelphia, where he will handle the Northern trade.

The new steel casting plant of the Delaware River Steel Casting Company, Chester, Pa., is rapidly nearing completion. The buildings are about completed, as is also a 30-ton open hearth furnaces, ovens for drying molds, &c. Sixty-four thousand square feet of floor space is available for molding purposes, and it is expected that the first heat will be run about May 25.

The Bryigon Steel Casting Company, Reading, Pa., have their new plant at Newcastle, Del., almost completed. The location of the new plant, which is situated on a plot of 16 acres directly on the Delaware River, with rail connections with the Pennsylvania Railroad, and which will later be extended by a connection with the Philadelphia & Reading Railroad, gives them excellent shipping facilities. The foundry building, of steel and corrugated iron, 62 x 624 feet; sand sheds, 48 x 88 feet; bench molders' department, 50 x 100 feet; a power house, 50 x 88 feet, and a blower house, 20 feet square, comprise the main buildings of the plant and are all completed. The foundry is served by two electric traveling cranes, 15 and 20 tons capacity. Two 2-ton converters are in position, and space is provided for additional ones if required. Foundations for the machinery are completed, and a 200 horse-power tandem compound Harrisburg engine and electric generator are on the ground. Boilers are in position, and it is confidently expected that within the next 30 days everything will be in shape for the first heat of steel.

Bridges and Buildings.

The Attica Bridge Company, Attica, Ind., have been awarded the contract for two steel bridges over the Wabash River in Warren County, Ind. The contract, involving both the steel and stone work on both bridges, amounted to $89,999.

The contract for building two steel bridges across Bull Creek at Columbus, Ga., has been let to the Southern Bridge Company, Birmingham, Ala., for $7371.

The Canton Bridge Company, Canton, Ohio, have been awarded a contract for the Grand Rapids bridge over the Maumee River by the County Commissioners of Wood and Lucas counties, Ohio. The bridge will be 650 feet long, of three steel spans, and their bid was $46,587. There were ten other bids ranging from $52,660. The same company were awarded the material in the old bridge for $1431.

A contract for a two-span 166-foot bridge at Waterville, Ohio, was awarded to the Massillon Bridge Company, Massillon, Ohio, for $20,500.

The County Commissioners of Muskingum County, Ohio, have placed a contract with the Mt. Vernon Bridge Company, Mt. Vernon, Ohio, for the erection of a steel bridge over the Muskingum River at Dresden at a cost of $17,600. E. J. Landor of Zanesville secured a contract for reconstructing the bridge at Gaysport after changes ordered by the War Department. Mr. Landor's bid for the work was $6100.

Fires.

Elevator "B" of the Canadian Pacific Railroad, at Fort William, Ont., was destroyed by fire May 12, causing a loss of $250,000.

A recent fire at Birmingham, Ala., badly damaged the machine shop of Beatty Brothers.

The two-story brick mill of the Tibbals Oakum Company, Cobalt, Conn., was destroyed by fire May 7; loss $15,000, on machinery and oakum.

On May 13 a fire did $15,000 damage to the power plant of Addison Electric Light & Power ompany, Addison, N. Y.

The Kyle Brothers' powder plant, near Lofty, Pa., was wrecked by an explosion May 12. The loss is placed at $20,000.

The factory of J. M. Brown, manufacturer of woven wire mattresses and furniture, at Nashua, N. H., was destroyed by fire Sunday, 15th inst. The loss is practically total, including the machinery and power plant.

Hardware.

The Howe Scale Company, Burlington, Vt., have a large order from the Russian Government for scales to be used in the commissary service of its army in the field.

The Mudd Mfg. Company, Chicago, makers of iron toy banks, stoves and sad irons, have recently purchased a manufacturing plant at Hanson Park, on the Chicago, Milwaukee & St. Paul Railroad, 8 miles northwest of the center of the city. This plant comprises a foundry, 64 x 200 feet, containing a 5-ton and a 25-ton cupola, and a factory building, 64 x 125 feet. This building, now one story in hight, is being increased to two stories by the new owners. The power for the plant is furnished by a 100 horse-power Erie boiler, just purchased, and by a New York safety vertical engine, 85 horse-power, direct connected to a 65-kw. generator. A complete nickel plating plant will also be installed. As soon as the new factory is completed, the present manufacturing plant at Austin avenue and Lincoln street and their foundry on Oakley avenue will be removed to the new quarters. The company, who were formed last December, consist of Frank X. Mudd and J. A. Mudd of Chicago and A. L. Johnson of Muncie, Ind. They are incorporated for $25,000.

The Adjustable Wrench & Specialty Company, Harvard, Ill., have incorporated with a capital stock of $100,000, to make wrenches and appliances. The incorporators are P. M. Knippenberg, F. W. Hahn and L. J. Husson.

The foundry of the Southern Foundry & Machine Company, Knoxville, Tenn., has been in operation for the past five months, and they are manufacturing and shipping sash weights all over the South and as far West as Missouri and Kansas. They state that they are in position to fill carload orders promptly on receipt.

R. Wallace & Sons, silver ware manufacturers, Wallingford, Conn., will build an addition to their plant, 31 x 70 feet, two stories, of brick and steel construction. They will also build on to their office structure a three-story brick addition, 24 feet square, the present office building being raised one story.

The Bevin Bros. Mfg. Company, East Hampton, Conn., will erect a brick addition to their plant, 27 x 100 feet, two stories. The building will be used for storage purposes.

The Standard Screw Company held their annual meeting at Jersey City, N. J., Wednesday, May 11, at which several changes in the Board of Officers were made, owing to the retirement of President C. E. Roberts of Chicago, who resigned wishing to be relieved of the burden of the office, and also owing to the absorption by the company of the Illinois Screw Company, which went into effect March 1. The new Board of Officers are: President, W. P. Pearson of Detroit, recently of Chicago; vice-president, A. W. Gifford of Worcester, Mass.; treasurer, Edward B. Dollivar of Worcester, Mass.; secretary, George Thrall of Detroit; directors, these officers and H. H. Taylor of Detroit, E. B. Cadwell of New York, and James C. Young of Jersey City. The Standard Screw Company were organized in 1900, being a combination of the Chicago Screw Company, the Worcester Machine Screw Company of Worcester, the Detroit Screw Works and the Pearson Machine Company of Chicago. The Illinois Screw Company are a recent acquisition of the company.

The Sessions Clock Company, Forestville, Conn., are erecting a brick factory addition, 50 x 160 feet, three stories, to be used for a finishing shop. The building will be of modern mill construction.

The Froelich Mfg. Company, St. Paul, Minn., who were incorporated in March last for the manufacture of the Neostyle washing machine, have fitted up new offices in connection with their factory, which they will occupy about May 20. G. W. Froelich, president of the company, will superintend the marketing of the factory's output.

The Scientific Toy Company, New Haven, Conn., have incorporated under Connecticut laws, with a capital stock of $16,000. The officers are: President, Levi T. Snow; vice-president, John B. Kennedy; treasurer, Frederick L. Trowbridge; directors, these officers and Charles W. Whittlesey and Fred. T. Bradley. The company manufacture toys and novelties.

Union Cutlery & Hardware Company, Unionville, Conn., have bought out Union Nut Company's cutlery department, in which tin plated knives, forks and spoons have been made. They will continue the manufacture of this line in connection with their other products.

American Wire Washer Company, Unionville, Conn., are contemplating the removal of their factory to Hartford, Conn., where they will manufacture spring washers for the automobile trade.

The Union Novelty Works, Putnam, Conn., whose factory was burned out April 24, are already at work rebuilding and hope to have their new plant completed by September 1.

The Ohio Steel Wheelbarrow Company, Toledo, Ohio, will erect a one-story brick structure, 40 x 100 feet, where they will manufacture steel wheelbarrows. J. F. Zahm is president and C. G. Cone secretary of the company.

Miscellaneous.

The Orient Coke Company, Pittsburgh, have given a contract to P. F. McCann, Greensburg, Pa., for the building of 300 coke ovens near New Salem, Fayette County, Pa. O. W. Kennedy, formerly with the H. C. Frick Coke Company, is general manager.

The Merritt air brake will be manufactured by the Merritt Air Brake Mfg. Company and not by the American & British Mfg. Company, as was at first planned. The Merritt Company are to lease the Wheelock Engine Company's plant at Worcester, Mass., now owned by the American & British Mfg. Company.

The Britton Leather Company, Brewer, Maine, will extend their plant by the erection of an addition, 50 x 100 feet, and four stories. A powerful hydraulic press for degreasing purposes will be included in the new equipment.

The Scandinavian Can & Machine Company will establish a factory at Southwest Harbor, Maine, for the manufacture of tin cans for sardine packing, and also the machinery for making the cans. A factory building has been leased for the purpose.

W. E. Brown and E. D. Ellsworth of Union City, Mich., have leased the Manistee Iron Works, Manistee, Mich., for the purpose of making new molds for the manufacture of building blocks of any style; also water tables, chimney blocks, window caps and a hand power mixer for mixing concrete.

The Oconee Handle, Lumber & Steam Boat Company, Greensboro, Ga., have been organized by W. C. Roeker, A. P. Ross and J. C. Lee. The company will install a $50,000 plant for the manufacture of handles, lumber, shingles and swingletrees.

The Victor Metals Company are now building their new rolling mill adjacent to their plant in East Braintree, Mass., which will be used for rolling Victor noncorrosive silver metal into sheets, rods and tubing. The company's New York office is at 29 Broadway.

The William Wurdack Electric Mfg. Company, recently incorporated, have taken over the plant and business of William Wurdack, 1115 Pine street, St. Louis, Mo., manufacturer of electrical specialties and devices used in the distribution of electrical energy. Some additions have been made to the plant for present needs, but later it is their intention to secure a larger building and install a number of new machines.

The International Railway Signal Company, Winston-Salem, N. C., were recently incorporated to manufacture a railway signal invented by C. R. Trapier. Some of the leading men in that city are interested in the company, and it is their intention to erect a new plant. Address Walter O. Cox, attorney.

Work on the new plant of the Railway Steel Spring Company at Oswego, N. Y., is progressing rapidly. This building is being erected around and over the present plant, and it is not thought that there will be any great amount of new equipment installed.

The York Safe & Lock Company, York, Pa., have been making large shipments of safe and vault work during the past week. One shipment included two carloads to New York City, two carloads to Richmond, Va., one carload to Philadelphia, and one carload to Chicago, Ill.

The Lebanon Chain Works, Lebanon, Pa., have received a contract from the William Cramp Engine & Ship Building Company, Philadelphia, for two suites of chain, being the first order that this company received from the Cramps. Previously all the chain used at the shipyards was made in Philadelphia.

The Euclid Automobile Company, Cleveland, have been incorporated with $25,000 by Wade McIlrath, John W. Orndorf, E. W. K. Hopkins, Benson McIlrath, Harry W. Orndorf and Clyde Martin. They will manufacture and repair automobiles and will erect a brick building 40 x 150 feet and two stories high at 2266 Euclid avenue.

The steamer "Martin Mullen," built for Charles L. Hutchinson and others of Cleveland, was launched at the Cleveland yards of the American Shipbuilding Company last week. Aside from the fact that the vessel was a large and modern freighter, the launching was a marked incident from the fact that with this launching the stocks of great lakes shipyards was cleared for the first time in many years. In all the yards of the American Shipbuilding Company the stocks are now empty, and the same is true of the independent yards with the exception of a car ferry being built by the Great Lakes Engineering Company at Detroit.

The Pope Motor Car Company, Toledo, Ohio, will place contracts within a few days for two new buildings to cost $50,000. One of the structures will be 60 x 180 feet, one story high, and will be used for testing automobile engines. The other building will be three stories high, 50 x 200 feet, constructed of brick, and will be used for the production of automobile bodies. Considerable wood working machinery will be installed.

Henry E. Ide, trustee in bankruptcy of the Townsend & Downey Shipbuilding Company, New York, has been authorized to borrow $100,000 to complete work already begun and unfinished and for the protection and preservation of the company's plant at Shooter's Island.

National Metal Trades Association Notes.

CINCINNATI, May 16, 1904.—The Cincinnati Metal Trades Association held its annual meeting and smoker at the Business Men's Club on Thursday evening, May 12. The officers elected for the ensuing year were William Lodge, president; F. A. Geier, vice-president; B. B. Quillan, secretary; Benjamin Sebastian, treasurer; J. C. Hobart, R. K. LeBlond and S. Egan, committeemen. T. W. Combs was appointed assistant secretary. Various reports were read and approved. The last three months show the workings of the labor bureau to have been as follows: Total number applications received, 195; total number of men employed, 186; total number of men applying in person, 456, 75 of this number having been located. They have about 7000 men on record, and everything is reported in a flourishing condition. After the business of the evening had been transacted the remainder of the time was devoted to social features. F. A. Geier gave a very interesting and instructive talk on his recent trip abroad. He dwelt particularly upon the methods employed throughout Continental Europe in the machine tool industry, comparing them with our own shops in America.

W. G. Fairbairn, secretary of the Milwaukee Metal Trades and Foundry Bureau, reports April showing a slight improvement in condition in the shops of his members. This was especially noticeable the latter part of the month.

Frank A. Wilson, secretary of the Boston Labor Bureau, reports a slight improvement in business.

George M. Cooper, secretary of the Manufacturers' Association of Pittsburgh, advises that there will be a general meeting to discuss "What shall be done at the expiration of the present agreement with the molders?" on Friday, May 27.

The machinists' union of Quincy, Ill., is adopting a new method in investigating the tax records of the city, to find out whether or not the concerns who locked them out have been paying the proper amount of taxes.

The new certificate of recommendation which will be issued shortly will embody several new features, the most prominent of which will be a complete identification of the holders, the form of which will be printed on bankers' safety paper, thereby eliminating any possible trafficking in these certificates.

There is no great likelihood of a machinists' strike being called in Chicago, owing to the great number of machinists who are on a strike along the line of the Santa Fe road.

The Conference Committee of the Chicago Metal Trades Association have submitted to District Council No. 8, International Association of Machinists, an agreement covering the question of wages, hours, overtime, &c., to take effect as of May 1, 1904, and so remain until May 1, 1905.

The Iron and Metal Trades

Reports from all the leading markets are practically unanimously to the effect that business is very dull, indeed. The works in many branches are quite busy yet, but new tonnage is coming in very slowly, and the conviction is growing in the Iron trade that the industry must face the prospect of a very quiet summer. Since prices in a good many lines of Finished Material are not by any means low now, buyers are very conservative and cannot be readily tempted to abandon their reserve. They do not anticipate any trouble in getting deliveries whenever they should need the material.

Some of the Southern Pig Iron makers have weakened, and are naming $9.50 for No. 2 Foundry at Birmingham without apparently securing any business of consequence. It looks, therefore, as though they must recede further before effecting large sales. In some districts some of the Northern furnacemen are still holding aloof, but others are keenly alert and are meeting the situation. Some of the foundries complain that the weakness in Pig Iron has been frightening off their customers.

There are reports that a Canadian Steel interest is in the market for a considerable tonnage of Bessemer Pig, and may purchase as much as 100,000 tons. The contractors for the Pennsylvania Tunnel Castings are reported to be in the market to cover the 30,000 tons taken, but nothing has been done as yet.

Reports from the Central West state that a considerable tonnage of Ore has been placed on the basis of $3.25 for Old Range Bessemer and of $3 for Mesaba.

In the heavy lines of Iron and Steel the tonnage placed continues disappointingly light. A little is being done in Steel Rails and some moderate car orders have been placed. Structural Steel is growing more quiet, the only recent transaction of consequence being the placing of an order for 12,000 tons for the South Side Terminal at Pittsburgh. In the Plate trade rumors of the cutting of prices continue to appear.

As was to be expected, the tonnage in Wire products is falling off somewhat with the end of the spring season. The Sheet mills are a little less busy, too, but the Tin Plate works and the Tube mills are as active as ever. Thus, it is reported that 98 per cent. of the capacity of the Tin Plate mills of the United States Steel Corporation is in operation, while over 86 per cent. of the welding capacity of the Tube mills of the same interest is producing.

A Comparison of Prices.

Advances Over the Previous Month in Heavy Type, Declines in Italics.

At date, one week, one month and one year previous.

	May18, 1904.	May11, 1904.	Apr.20, 1904.	May20, 1903.
PIG IRON:				
Foundry Pig No. 2. Standard. Philadelphia	*$14.50*	$15.00	$15.00	$19.50
Foundry Pig No. 2, Southern. Cincinnati	*12.00*	12.50	12.50	18.75
Foundry Pig No. 2, Local, Chicago	*13.75*	13.75	14.00	20.00
Bessemer Pig, Pittsburgh	*13.60*	13.60	14.20	20.10
Gray Forge, Pittsburgh	*12.50*	12.75	13.00	19.75
Lake Superior Charcoal, Chicago	*15.00*	15.00	15.25	24.00
BILLETS, RAILS, &c.:				
Steel Billets, Pittsburgh	23.00	23.00	23.00	30.50
Steel Billets, Philadelphia	*24.25*	24.25	25.00	28.00
Steel Billets, Chicago	24.00	24.00	24.00	32.50
Wire Rods, Pittsburgh	*30.00*	30.50	31.00	37.00
Steel Rails, Heavy, Eastern Mill	28.00	28.00	28.00	28.00
OLD MATERIAL:				
O. Steel Rails, Chicago	*10.50*	11.00	11.50	17.00
O. Steel Rails, Philadelphia	*12.50*	12.50	15.00	21.50
O. Iron Rails, Chicago	*16.00*	16.50	17.00	23.50
O. Iron Rails, Philadelphia	*15.00*	17.00	18.50	24.50
O. Car Wheels, Chicago	*13.00*	13.00	14.00	22.50
O. Car Wheels, Philadelphia	*12.00*	12.50	13.50	24.00
Heavy Steel Scrap, Pittsburgh	*11.75*	12.00	13.75	21.00
Heavy Steel Scrap, Chicago	*9.50*	10.00	11.50	17.00
FINISHED IRON AND STEEL:				
Refined Iron Bars, Philadelphia	1.48½	1.48½	1.48½	1.80
Common Iron Bars, Chicago	*1.40*	1.45	1.50	1.75
Common Iron Bars, Pittsburgh	*1.35*	1.35	1.40	1.80
Steel Bars, Tidewater	1.49½	1.49½	1.49½	1.75
Steel Bars, Pittsburgh	1.35	1.35	1.35	1.60
Tank Plates, Tidewater	1.74½	1.74½	1.74½	1.80
Tank Plates, Pittsburgh	1.60	1.60	1.60	1.60
Beams, Tidewater	1.74½	1.74½	1.74½	1.73½
Beams, Pittsburgh	1.60	1.60	1.60	1.60
Angles, Tidewater	1.74½	1.74½	1.74½	1.73
Angles, Pittsburgh	1.60	1.60	1.60	1.60
Skelp, Grooved Steel, Pittsburgh	**1.40**	1.35	1.35	2.00
Skelp, Sheared Steel, Pittsburgh	**1.40**	1.35	1.35	2.10
Sheets, No. 27, Pittsburgh	*2.10*	2.10	2.15	2.65
Barb Wire, f.o.b. Pittsburgh	2.50	2.50	2.50	2.60
Wire Nails, f.o.b. Pittsburgh	1.90	1.90	1.90	2.00
Cut Nails, f.o.b. Pittsburgh	1.75	1.75	1.75	2.15
METALS:				
Copper, New York	13.12½	13.37½	13.12½	14.75
Spelter, St. Louis	*5.00*	5.00	5.05	5.45
Lead, New York	4.50	4.50	4.50	4.37½
Lead, St. Louis	*4.37½*	4.35	4.40	4.15
Tin, New York	27.87½	27.60	27.87½	29.45
Antimony, Hallett, New York	*7.00*	7.25	7.25	7.00
Nickel, New York	40.00	40.00	40.00	40.00
Tin Plate, Domestic, Bessemer, 100 pounds, New York	3.64	3.64	3.64	3.99

Chicago.

(FISHER BUILDING, May 18, 1904.—*By Telegraph.*)

We are now passing through a period of dullness the like of which has not been experienced for a number of years, and it is a surprise that manufacturers have been able to hold up prices as well as they have in the face of the stagnation in demand. Some reductions have been made, it is true, Southern Pig Iron, for instance, being offered now on the basis of $9.50, Birmingham, for No. 2 and finding few takers even at that low price. Predictions are freely made that Alabama Iron producers will have to face a $9 market before affairs turn for the better, but in rebuttal of this proposition it is argued that the carriers' strike on the lakes may be prolonged through the summer, and that a shortage of Iron Ore in the North resulting from the consumption of present stocks at the furnaces will lead to startling advances in the price of Iron, and that for that reason furnaces either North or South would be very unwise to take contracts for the second half of the year at anything like present figures. Northern Iron is still held nominally at $13.75 to $14, and only a very small tonnage is moving. Billets are in rather slow demand, though Sheet Bars and Tin Plate Bars are supposed to be scarce and stiff in price, owing to the heavy demand on the part of the Tin Plate mills. The Rail market is practically dead. Structural Steel is in only occasional demand in small lots. Plates are extremely quiet, with persistent rumors of cuts in price on the part of members of the association. The Sheet market is ragged and uncertain, with a lower tone both in Black and Galvanized. Bar Iron has again weakened, in spite of the fact that a very good demand is springing up from car builders who have been favored with orders of considerable magnitude from Western roads. The

demand for Pipe, while showing a decrease, is better than most lines of Iron and Steel. Boiler Tubes are still quiet. Cast Iron Pipe is suffering a reduction of $1 per ton and is in slow demand at that. Old Materials have been mercilessly hammered down under the stress of large offerings, with relatively small takers. Wire products still retain much of their former activity, though they are falling off, as must be expected at this season of the year.

Pig Iron.—Taking into consideration the reduction of 20c. per ton on the freight rate on Southern Iron, it may be said that Foundry Iron from Alabama is purchasable in Chicago this week within 10c. to 15c. as cheaply as it ever was during the dullest season last November. In other words, Southern Iron is offered to-day on the basis of $9.50, Birmingham, which is $13.15, Chicago, as against $13.10, Chicago, the lowest official quotation for a number of years, and there are many of the opinion that the end is not yet. Some furnaces are still holding doggedly at the $10 figure, but, of course, are booking little or no business. The $9.50 price is made openly by factors of some importance, and the discouraging feature of it is that takers are few. This price is even made for delivery any time between now and the end of 1904. Northern Iron is still held nominally on the basis of $13.75 to $14, delivered Chicago, but there is no doubt that much lower prices than these would be named on inquiries of any magnitude. No tonnages of any magnitude have been placed, and such buyers as are in need of Iron are waiting for indications of strength before placing contracts. There is no longer any hope expressed that Iron prices will rule much higher until autumn or until the Presidential problem is solved, unless the lake carriers' strike may create a shortage; but the impression prevails that when the upward movement does start it may be accompanied by the same feverish conditions that raised prices of Iron high above their legitimate values two years ago. Railroads are buying little or nothing, in spite of the fact that their equipments need replacing and strengthening more this season than they have for years, owing to the exceptional strain due to the unprecedented severity of the winter just past. When railroad buying begins it will be the signal, so the prophets say, for a movement that will swing the pendulum as far above normal as it is below normal to-day. Prices are as follows, Chicago:

Lake Superior Charcoal	$15.00 to $15.50
Northern Coke Foundry, No. 1	14.25 to 14.50
Northern Coke Foundry, No. 2	13.75 to 14.00
Northern Coke Foundry, No. 3	13.25 to 13.50
Northern Scotch, No. 1	.... to 14.50
Ohio Strong Softeners, No. 1	15.30 to 15.55
Ohio Strong Softeners, No. 2	14.80 to 15.05
Southern Silvery, according to Silicon.	14.65 to 15.65
Southern Coke, No. 1	13.65 to 14.15
Southern Coke, No. 2	13.15 to 13.65
Southern Coke, No. 3	12.65 to 13.15
Southern Coke, No. 4	12.40 to 12.65
Southern Coke, No. 1 Soft	13.65 to 14.15
Southern Coke, No. 2 Soft	13.15 to 13.65
Southern Gray Forge	12.35 to 12.65
Southern Mottled and White	11.90 to 12.40
Malleable Bessemer	14.00 to 14.25
Standard Bessemer	15.30 to 15.80
Jackson County and Kentucky Silvery, 6 to 10 per cent. Silicon	16.80 to 18.30
Alabama Basic	13.40 to 13.65
Virginia Basic	14.40 to 14.65

Rails and Track Supplies.—The Rail business instead of showing improvement over last week is even quieter. One sale of 2000 tons of Standard Sections was placed last week, and only a few small pick up orders besides. Prices are maintained on Standard Section Rails on the $28 basis, and Light Sections are offered at from $23 to $26 per ton, Chicago. Angle Bars are still quoted at 1.40c. to 1.50c., Spikes at 1.65c. to 1.75c., base, while Track Bolts have been reduced to 2.30c. to 2.35c., base, with Square Nuts, and 10c. to 15c. extra for Hexagon Nuts.

Structural Material.—No orders of any moment have been placed during the week under review, and even the current car lot business is smaller than it has been. Prices are unchanged both from mill and store, as follows: I-Beams and Channels up to and including 15 inches and Angles 3 inches on one leg and larger, 1.76½c., Chicago; Tees, $1 per ton extra. Store prices on Structurals are as follows: Angles, Beams, Channels and Zees, base sizes, 2c. to 2.10c.; Tees, 2.05c. to 2.15c., either random lengths or cut to lengths 5 feet and over.

Plates.—There is persistent talk of cutting in the price of Plate, buyers insisting that concessions are being made on the part of members of the Plate Association. But outside of one or two independent mills all information obtainable points to the conclusion that prices are being maintained by the members of the association, in spite of the fact that business is so light that mills are scarcely able to keep in operation at all. The leading Western producer is still able to secure enough business from week to week to keep the mill running, though there is no promise each week that the mill may not have to close down the next for want of orders. Prices are as follows: Tank Steel, ¼-inch and heavier, 1.76½c.; Flange Steel, 1.86½c.; Marine, 1.96½c.; Universal Mill Plate, 1.76½c. to 1.81½c.; 3-16 inch Tank, 1.86½c.; Nos. 7 and 8, 1.91½c.; No. 9, 2.01½c.; No. 10, 1.91½c. to 1.96½c.; No. 11, 1.96½c. to 2.01½c.; No. 12, 2.01½c. to 2.06½c. Store prices are as folows: Tank Plate, 100 inches wide or less, ¼-inch and heavier, 2c. to 2.10c.; 3-16 inch, 2.10c. to 2.15c.; Nos. 8 and 10, 2.10c. to 2.20c.; Flange quality, 25c. per 100 lbs. extra.

Sheets.—Although the general tendency of Sheets has been downward during the last week, it is not sufficiently marked to warrant us in reducing our quotations as published last week, which we repeat as follows, carload lots, from mill, f.o.b. Chicago: Nos. 9 and 10, 1.96½c. to 2.01½c.; Nos. 12 to 14, 2.06½c. to 2.11½c.; Nos. 15 to 17, 2.11½c. to 2.16½c.; Nos. 18 to 21, 2.16½c. to 2.21½c.; Nos. 22 to 24, 2.21½c. to 2.26½c.; Nos. 25 and 26, 2.21½c. to 2.31½c.; No. 27, 2.26½c. to 2.36½c.; No. 28, 2.36½c. to 2.46½c.; No. 29, 2.56½c. to 2.61½c.; No. 30, 2.71½c. to 2.76½c. Some changes have been made in the store prices, in line with the weakening on mill prices, gauges Nos. 16 to 27, inclusive, being reduced from 5c. to 10c. per 100 lbs. We quote: No. 8, 2.10c.; No. 10, 2.15c.; No. 12, 2.20c.; No. 14, 2.25c.; No. 16, 2.30c.; No. 18, 2.40c.; Nos. 20 to 24, 2.45c.; No. 26, 2.55c.; No. 27, 2.65c.; No. 28, 2.80c.; No. 29, 2.95c.; No. 30, 3.10c. Galvanized Sheets have experienced a reduction in prices, being now quoted at from 80 and 2½ to 80 and 10 per cent. discount, at mill, in carload lots. Store prices on Galvanized range from 75 and 7½ to 75 and 10 per cent. discount, with an occasional concession below this on large and desirable specifications.

Bars.—The price of Iron Bars has receded from the 1.45c. basis named in last week's issue, and the prices may be stated to be 1.40c. to 1.42½c., base, half extras, carload lots, Chicago. This means that mills making the prices are receiving from 1.30c. to 1.40c. at mill. Fortunately for the Bar business, a number of noteworthy orders for freight cars have been placed the last two or three weeks, and these have led to the booking of desirable tonnages of bars. Doubtless the influence of the buyers of these Bars has hammered down the market to its present figures, or considerably below current figures in the case of large tonnages. The C., B. & Q. Railroad Company's order for 1000 cars placed some weeks ago was reflected in an order for 4500 tons of Iron Bars, which was placed at somewhere about 1.25c. or 1.30c., Chicago. The Northern Pacific is about to place an order for between 900 and 1000 freight cars. The M., K. & T. is understood to have placed an order for about 500 cars, and two or three other roads for smaller lots of cars. In the majority of the cases the makers of these cars will use Iron instead of Steel Bars. Steel Bars and Bands remain unchanged on the basis of 1.35c., Pittsburgh, or 1.51½c., base, half extras, Chicago, in carload lots. Hoops are still quoted on the basis of 1.40c., Pittsburgh, or 1.56½c. rates, full extras, Chicago, in carload lots. Implement manufacturers are still fairly active in specifying against current requirements, and a number of desirable contracts have been booked for the year ending July, 1905. Store prices are unchanged, as follows: Iron Bars, 1.75c., base, full extras; Steel Bars, 1.70c. to 1.80c., base, half extras; Hoops, 2.10c. rates, full extras.

Merchant Steel.—This has been an extremely quiet week so far as specifications are concerned and but very few contracts have been placed for the coming season. Prices remain unchanged, as follows: Open Hearth Spring Steel to the general trade, 2c. to 2.25c.; Smooth Finished Machinery Steel, 1.76½c. to 1.81½c.; Smooth Finished Tire, 1.71½c. to 1.76½c.; Sleigh Shoe, flat, 1.56½c. to 1.61½c.; Sleigh Shoe, concave and convex, 1.66½c. to 1.71½c.; Cutter Shoe, 2.25c. to 2.35c.; Toe Calk Steel, 2.06½c. to 2.11½c.; Crucible Tool Steel, 6½c. to 8c.; special grades of Tool Steel, 13c. and up; Shafting at 52 per cent. in car lots and 47 per cent. in less than car lots.

Merchant Pipe.—The Pipe business continues to be good, as compared with most other lines of Finished Iron and Steel, and it is not necessary for independents to cut prices to any great extent in order to get enough business to keep their mills running. Both the leading producer and independents express themselves as satisfied with present conditions, and their one hope is that business may continue through the balance of the season as it is now. The discounts offered by the leading producer for delivery at Chicago in carload lots are as follows:

	Steel Pipe.		Guar. Wr'ght Iron.	
	Black. Per cent.	Galv. Per cent.	Black. Per cent.	Galv. Per cent.
⅛ to ¾ inch	66.35	56.35	64.35	54.35
½ inch	69.35	59.35	67.35	57.35
¾ to 6 inches	73.35	63.35	71.35	61.35
7 to 12 inches	69.35	59.35	66.35	56.35

Less than carloads, 12½ per cent. advance.

Boiler Tubes.—Business has again slacked off, and the demand for Tubes, both from mill and store, is very unsatisfactory. The official discounts of the leading producer are as follows, but large buyers are able to secure somewhat better figures on desirable tonnages. The official prices of the leading producer are as follows:

	Steel.	Iron.	Seamless steel.
1 to 1¼ inches	43.35	40.80	53.35
1⅜ to 2¼ inches	55.85	38.35	40.35
2½ inches	58.35	43.35	40.35
2¾ to 3 inches	64.35	50.85	} up to 4 in.
6 to 13 inches	55.85	38.35	{ 48.35 ....

Store discounts on Tubes are unchanged, as follows:

	Steel.	Iron.	Seamless steel.
1 to 1½ inches	40	35	37½
1¾ to 2½ inches	50	32½	35
2¾ to 5 inches	60	45	45
6 inches and larger	50	32½	..

Cast Iron Pipe.—The leading producer of Cast Iron Pipe has conceded reductions about $1 per ton on prices quoted last week, making 4-inch Water Pipe $26, and 6-inch and heavier $25, with $1 extra for Gas Pipe. The week has been a quiet one, and no contracts of note have been concluded.

Old Materials.—Nearly every member on the list is reduced in price from 50c. to $1.50 per ton, and on several other lines where reductions are not named the old prices are repeated, rather because there is not enough market to make a new price than because of any exceptional strength in these lines. A number of large lists have been promulgated within the past week, including about 3000 tons from the Toledo & Ohio Central, about 1000 tons from the Union Pacific, and something like 1500 tons from the Chesapeake & Ohio, with smaller tonnages from other roads. The supply greatly exceeds the demand, and such dealers as have been a bull force in the market because of unfilled contracts have in the majority of cases been able to cover their shortages and are now on the bear side. The following prices must be taken as representing a fair average of a large number of transactions rather than a flat price, as prices are made to order nowadays on these lines to fit the necessities of buyer and seller. A fair average of current prices which railroads are getting for Materials is as follows, carload lots, per gross ton, Chicago:

Old Iron Rails	$16.00 to $16.50
Old Steel Rails, 4 feet and over	12.00 to 12.50
Old Steel Rails, less than 4 feet	10.50 to 11.00
Heavy Relaying Rails, subject to inspection	23.00 to 24.00
Heavy Relaying Rails, for side tracks	18.00 to 20.00
Old Car Wheels	13.00 to 14.00
Heavy Melting Steel Scrap	9.50 to 10.00
Mixed Steel	9.00 to 9.50

The following quotations are per net ton:

Iron Fish Plates	$13.00 to $13.50
Iron Car Axles	17.00 to 17.50
Steel Car Axles	15.00 to 15.50
No. 1 Railroad Wrought	11.00 to 11.50
No. 2 Railroad Wrought	10.00 to 10.50
Shafting	13.50 to 14.00
No. 1 Dealers' Forge	9.00 to 9.25
Wrought Pipe and Flues	8.00 to 8.25
Iron Axle Turnings	8.00 to 8.25
Soft Steel Axle Turnings	8.00 to 8.25
Machine Shop Turnings	7.00 to 7.25
Cast Borings	4.00 to 4.50
Mixed Borings, &c	4.00 to 4.50
No. 1 Mill	7.00 to 7.25
Country Sheet	6.50 to 7.00
No. 1 Boilers, cut in Sheets and Rings	8.50 to 9.00
Heavy Cast Scrap	10.00 to 10.50
Stove Plate and Light Cast Scrap	8.00 to 8.50
Railroad Malleable	9.00 to 9.50
Agricultural Malleable	8.00 to 8.50

Metals.—Metals are, if anything, duller than ever. Copper has been reduced about ¼c., being now quoted at 13¼c. for Casting and 13½c. for Lake. Pig Tin is now quoted at 29¼c. to 29⅜c. Pig Lead is still sold at 4.45c. for 50-ton lots, but car lots now go at 4.55c., and smaller lots at about 4.75c. Spelter in car lots is quoted at from 5.15c. to 5.20c., and in less than car lots from 5.35c. to 5.50c. Sheet Zinc is unchanged at 6.20c. for car lots of 600-lb. casks and 6.45c. to 6.50c. on less than car lots. Old Metals are weak, with a decline of ¼c. in Heavy Copper and ⅜c. on Heavy Yellow Brass. Sheet Zinc is 1-5c. higher. We quote: Copper Wire and Heavy, 11½c.; Copper Bottoms, 10⅝c.; Copper Clips, 11¼c.; Red Brass, 10½c.; Red Brass, Borings, 8⅞c.; Yellow Brass, Heavy, 8c.; Yellow Brass Borings, 6⅝c.; Light Brass, 5¾c.; Tea Lead, 4c.; Zinc, 3.95c.; Pewter, No. 1, 18½c.; Block Tin Pipe, 24c.

Coke.—There is no longer any pretence of getting more than $2 at the ovens for 72-hour Connellsville Foundry Coke except in cases where customers are willing to pay fancy prices for fancy brands. This makes the maximum price, Chicago, $4.65 for Connellsville, and Coke from other regions is selling on track here all the way down to $4 per ton. Stonega Coke, which is taken as the representative of the West Virginia ovens, sells at $4.15 to $4.25, while New River, Pocahontas and Klondike brands, which do not enjoy the low L. & N. freight rate, sell at $4.15 to $4.65, according to conditions attending the sale. Where Coke is offered as low as $4 for 72-hour Foundry quality it means that interests here are taking losses on Coke that was shipped long ago at a time when a strike seemed imminent, and the low price is due to the fact that the material must be disposed of or the daily demurrage penalty of $1 per car will soon eat up the value of the cargo. It is thought that the quantity of demurrage Coke is gradually decreasing and that the existence of $4 Coke in Chicago is an accident, which will not be repeated after the tracks are cleared of this character of freight.

Philadelphia.

FORREST BUILDING, May 17, 1904.

Events during the past week have not been favorable to the Iron and Steel interests. The statistical position appears to be good, but there is a general opinion that the output of Pig Iron is much greater than will be required during the remainder of the year. Nevertheless, it is surprising how much Pig Iron has been consumed during the past two or three months; all departments have complained of the scarcity of business, yet statistics indicate that consumption has run pretty close to 1,500,000 tons per month. The immediate outlook, however, is decidedly reactionary. The falling off in demand during the past two or three weeks is a clear indication that business during the summer months will be extremely light, and that the current production of Pig Iron is likely to be much too large. All lines of business are beginning to feel the depression, and as the uncertainties mentioned in recent reports are in no degree less than before, it naturally follows that business will continue to lag. Crops, finances, labor and politics are dominant features, and until they are measurably settled there is very little chance for business activity. There is plenty of work in prospect, and if nothing detrimental arises next year ought to develop considerable improvement, but it requires a good deal of optimism to enthuse over the immediate outlook. Work that is now figured on can hardly materialize to any extent during 1904, and it may be well into 1905 before it assumes great activity, so that in the interim there will probably be a far reaching adjustment in prices, which is essential to anything approaching to permanent or prosperous conditions. For the time being there is hardly anything doing except in a hand to mouth way. If it was a question of prices an attempt would be made to adjust them, but as there is so little business price is no consideration; neither will it be until material is wanted, which is not the case at the present time except in a merely retail kind of way.

Pig Iron.—There is so little demand for Pig Iron that it is difficult to say what prices are likely to rule in the near future. Nominally they are the same as last week, and what little business has been done was at about $15, delivered, for No. 2 X Foundry, and $13.50 for Gray Forge, but it is believed that buyers will require at least 25c. reduction before they will take hold freely, and even then it is not certain that 25c. reduction would secure any very heavy tonnage. Southern Irons are uncertain, but $9.75, at furnace, is openly quoted for No. 2 X; $9.50 accepted for good sized lots, with a chance that still better could be done on bids from first-class buyers. Some of the Lehigh and Schuylkill furnaces intimate that $14, at furnace, would be their minimum price for No. 2 X, and rather than go below that they would blow out their furnaces. Others announce their intention of staying in the market, and if others see fit to abandon their trade, so much the better for those who intend to fight it out. At the present cost of production it is claimed that some companies are running behind, and while that may be true, it will have no influence on the market, except to the extent to which it may determine them to go out of business. The statistical position appears to be favorable, but there are few who believe that consumption will be large enough during the next three months to warrant a production of 367,000 tons weekly, and this above all others will be the determining feature. Under these circumstances it is no wonder that the market is dull, it would be strange if it were otherwise. Buyers take the ground that there will be plenty of Iron anyway, and even if prices do not decline, there is no danger of an advance; therefore, they have nothing to lose by waiting, while they may perhaps have something to gain. Of course, conditions may be changed by a curtailment in production, or by an increase in consumption, but it will be time enough to act when there are indications that one or the other is likely to happen. For the present, therefore, there is a dull and uninteresting market at about the figures named below. A few sales of 1000 to 2000 or 3000 lots at inside figures, but most of the business in small lots at medium or inside figures. Prices are about as follows for Philadelphia or nearby points:

No. 1 X Foundry	$15.25 to $15.50
No. 2 X Foundry	14.50 to 15.00
No. 2 Plain	14.00 to 14.25
Alabama No. 2, rail shipment	14.00 to 14.25
Alabama No. 2, on dock	13.25 to 13.50
Standard Gray Forge	13.50 to 13.75
Ordinary Gray Forge	12.75 to 13.00
Basic	13.75 to 14.00

Steel.—There is a little better demand, and $24.25 seems to be an inside figure on the general run of business. Small lots command more money, but it cannot be said that the market is strong.

Plates.—Some mills appear to be doing a trifle more than last week, but the business is not of a character to warrant expectations of much improvement. Most of the orders are for small lots, as large consumers appear to be taking in very little new business at present. There are inquiries a-plenty, but the resultant business is not of any great importance. Prices are maintained as last quoted—viz.:

	Carloads. Cents.	Part carloads. Cents.
Tank Steel, ¼ inch and heavier	1.73½	1.78½
Tank Steel, 3-16 inch	1.83½	1.88½
Tank Steel, Nos. 7 and 8, B. W. G.	1.88½	1.93½
Tank Steel, Nos. 9 and 10, B. W. G.	1.98½	2.03½
Flange or Boiler Steel	1.83½	1.88½
Commercial Fire Box Steel	1.93½	1.98½
Still Bottom Steel	2.03½	2.08½
Locomotive Fire Box Steel	2.23½	2.28½
Plates over 100 to 110 inches	.05 per lb. extra	
Plates over 110 to 115 inches	.10	"
Plates over 115 to 120 inches	.15	"
Plates over 120 to 125 inches	.25	"
Plates over 125 to 130 inches	.50	"
Plates over 130 inches	1.00	"
All sketches (excepting straight taper plates varying not more than 4 inches in width at ends, narrowest end being not less than 30 inches)	.10	"
Complete Circles	.20	"
Shell grade of Steel abandoned.		

Structural Material.—There is little of interest to report in this department, as large operations are all more or less in abeyance temporarily. How long this will continue it is impossible to say, but in the meanwhile small and medium sized orders are about all that can be obtained. There is some prospect of an early demand for Structural Material for the burned districts, but so far nothing important can be reported as definitely closed. Prices are unchanged: Beams, Channels and Angles, 1.73½c. to 1.85c., according to specifications, and small Angles, 1.50c. to 1.55c.

Bars.—The demand is extremely light, and while prices are nominally unchanged, it is intimated that Steel Bars have been bought at less than the 1.35c. base price. Refined Iron is also very dull, but so far as the mills are concerned prices are maintained at 1.48½c. minimum to 1.55c. for strictly Refined Iron. Prospects are not good and there is some doubt whether prices can be maintained much longer, unless there is a better demand.

Sheets.—There is somewhat more business and mills appear to hold their own as regards employment, but they are placing very little in their order books for late deliveries. Prices are about the same as last week, but not very strong when first-class business is in sight.

Old Material.—It is impossible to quote prices with much exactness, as there is hardly any demand. Some who are disposed to meet the market, or are under the necessity for so doing, have to accept extremely low figures, others are more disposed to wait for a market before pressing sales. As near as can be given bids and offers for deliveries in buyers' yards would be about as follows:

No. 1 Steel Scrap	$12.50 to $12.75
Low Phosphorus Scrap, nominal	17.50 to 18.00
Old Steel Axles	15.00 to 16.00
Old Iron Rails	15.00 to 16.00
Relaying Rails	21.00 to 22.00
Old Iron Axles	18.00 to 19.00
Old Car Wheels	12.00 to 13.00
Choice Scrap, R. R. No. 1 Wrought	15.00 to 16.00
Yard Scrap	14.00 to 14.50
Machinery Scrap	12.50 to 13.00
No. 2 Forge Fire Scrap	11.00 to 12.00
No. 2 Forge Fire Scrap (Ordinary)	9.00 to 10.00
Wrought Turnings	9.00 to 9.50
Axle Turnings, Choice Heavy	10.50 to 11.00
Cast Borings	6.50 to 6.75
Stove Plate	10.00 to 10.50
Wrought Iron Pipe	11.00 to 11.50

James B. Bonner, manager of sales of the Philadelphia office of the Carnegie Steel Company, announces the removal of the offices to the Pennsylvania Building.

Cincinnati.

FIFTH AND MAIN STS., May 18, 1904.—(*By Telegraph.*)

Pig Iron.—Another week of dullness has been the record for the Pig Iron market. If the week preceding was devoid of any life, what shall be said of the week just passed? Probably not for years have sellers experienced such a season of unfruitfulness, and they are more and more feeling the depression that exists and are very pessimistic as to the future. Our quotations last week showed that No. 2 Foundry could be bought on a $9.75, Birmingham, basis, with some furnaces holding out for $10. To-day $9.50 represents the maximum figure and some agencies are even inclined to shade this price, if necessary, to obtain the business; in other words, the market is somewhat demoralized, with a general tendency toward lower prices. The sales made during the week with but few exceptions have been in small quantities, consumers purchasing only enough for immediate needs. The only notable transaction recorded for the week was a sale of 900 tons Northern and Southern for Toledo and Columbus deliveries, and reported to have been made as follows: 300 tons of Northern No. 2 at $13.15 and 300 tons of Northern No. 3 at $12.65, Dayton delivery; 200 tons of Southern No. 2 at $9.40 and 100 tons of Southern Charcoal at $13.50, Birmingham basis. All the foundries are working on short time, as are also the agricultural implement makers, whose busy season was some months previous. A new Pig Iron furnace at Battelle, Ala., will be ready for operation some time during the first part of July. This is the property of the Lookout Mountain Company and will be most modern in all its details. They will use a mixture of Red and Brown Ore, of which in their 14,000-acre tract they have an almost inexhaustible supply of the former. They will mine their own Coal and make what Coke is needed for their own furnace. Freight rates from Hanging Rock district to Cincinnati, $1.15, and from Birmingham, $2.75. We quote, f.o.b. Cincinnati, as follows:

Southern Coke, No. 1	$12.50 to $12.75
Southern Coke, No. 2	12.00 to 12.25
Southern Coke, No. 3	11.50 to 11.75
Southern Coke, No. 4	11.00 to 11.25
Southern Coke, No. 1 Soft	12.50 to 12.75
Southern Coke, No. 2 Soft	12.00 to 12.25
Southern Coke, Gray Forge	10.75 to 11.00
Southern Coke, Mottled	10.50 to 10.75
Ohio Silvery, No. 1	15.65 to 16.15
Lake Superior Coke, No. 1	13.65 to 13.90
Lake Superior Coke, No. 2	13.15 to 13.40
Lake Superior Coke, No. 3	12.65 to 12.90
Car Wheel and Malleable Irons.	
Standard Southern Car Wheel	$16.25 to $16.75
Lake Superior Car Wheel and Malleable	15.80 to 16.30

Coke.—The Coke Market is almost barren of any activity. What sales have been made are for immediate needs and are of small import. We quote, f.o.b. ovens, Connellsville, $1.75 to $2.

Plates and Bars.—There is no change in this class of material. Everything is unusually quiet and the market is lively. We quote, f.o.b. Cincinnati, as follows: Iron Bars, in carload lots, 1.40c., with half extras; the same in smaller lots, 1.70c., with full extras; Steel Bars, in carload lots, 1.48c., with half extras; the same in smaller lots, 1.80c., with full extras; Base Angles, 1.73c., in carload lots; Beams and Channels, in carload lots, 1.73c.; Plates, ¼-inch and heavier, 1.73c., in carload lots; in smaller lots, 2c.; Sheets, 16-gauge, in carload lots, 2.05c.; in smaller lots, 2.60c.; 14-gauge, in carload lots, 1.95c.; in smaller lots, 2.50c.; Steel Tire, ¾ x 3-16 and heavier, 1.68c., in carload lots.

Old Material.—Conditions remain void of any active features and there is practically no demand. We quote dealers' prices, f.o.b. Cincinnati, as follows: No. 1 Railroad Wrought Scrap, $11 to $11.50 per net ton; No. 1 Cast Scrap, $9.25 per net ton; Iron Rails, $14.50 per gross ton; Steel Rails, rolling mill lengths, $11 to $11.50 per gross ton; Iron Axles, $15 per net ton; Car Wheels, $11 to $11.50 per gross ton; Heavy Melting Scrap, $11.50 per gross ton; Low Phosphorus Scrap, $11.50 to $12 per gross ton.

Cleveland.

CLEVELAND, OHIO, May 17, 1904.

Lake commerce has been tied up by a strike precipitated by the refusal of the Lake Carriers' Association to concede the demands of the Masters' and Pilots' Association. After prolonged negotiations between the two sides to the controversy all efforts to bring about a settlement, for the time being at least, were abandoned the latter part of last week. At present the masters and pilots are trying to break down the resistance of the owners by endeavoring to persuade the smaller vessel owners to sign contracts. The hope is that the vessel owners in the Lake Carriers' Association, seeing their smaller competitors operating fleets, will be persuaded to emulate the example if from no other motive than one of self preservation. The Lake Carriers' Association has so far presented a solid front to the masters and pilots.

Iron Ore.—The Ore situation has not changed very much, except that some annoying figures have been compiled by the trade. These figures show that there are available now between 10,500,000 and 11,000,000 tons of Ore on the lake docks and furnace stock piles. These figures, showing that there was left out of last year's shipment fully 40 per cent. of the entire season's movement, assure the consumer that there is left on the docks fully enough Ore to last until September at least, with the present rate of consumption. Nothing has been done in the way of Ore sales that would give any indication of what the current market for Ore is, but it is known that some of the mines have offered liberal reductions even from the scale as agreed upon at New York, without inducing any of the consumers to cover their needs. No arrangements of any sort have been made for the movement of that material down the lakes. The market for lake business has, in fact, not been more quiet in 15 years than it is at the present time.

Pig Iron.—The market seems to be a waiting one in every respect. The time is not far away when something must be done. Either buying of Iron will have to be started or some of the furnaces will have to go out of blast. The buying of Foundry now is entirely to fill current needs, without any indication of a contracting movement. Bessemer and Basic are off the market for the time being and no one seems willing to hazard a guess as to what the prices are likely to be. The market range of possible prices is very wide, most current estimates ranging from $12.50 to $13.50 in the Valleys for both Bessemer and Basic. The Coke situation is very easy. We quote Pig Iron, f.o.b. cars, Cleveland, as follows:

Northern Coke, No. 1 Foundry	$14.00 to $14.25
Northern Coke, No. 2 Foundry	13.50 to 13.75
Northern Coke, No. 3 Foundry	13.00 to 13.25
Southern Coke, No. 1 Foundry	14.35 to 14.60
Southern Coke, No. 2 Foundry	13.60 to 13.85
Southern Coke, No. 1 Soft	14.10 to 14.35
Southern Coke, No. 2 Soft	13.60 to 13.85
Jackson County, 8 per cent. Silicon	16.50 to 17.00
Hanging Rock Charcoal, No 1	.... to 23 45
Southern Charcoal, No. 1	19.50 to 20.00
Lake Superior Charcoal	16.50 to 17.00

Finished Iron and Steel.—The market is about as quiet as it has been at any one time since the present dullness set in. Consumers do not show any tendency to contract, the buying being mostly hand to mouth. The Bar Iron situation is unchanged. There is not a strong demand, but prices hold steady because the cost of production is so high. In Bar Steel most of the agricultural implement works have about cleaned up for this year and will not begin to specify again until the fall trade is starting it. Prices hold at 1.35c., Pittsburgh, for Bar Iron and Bessemer Steel Bars, with Open Hearth Steel Bars holding firm at 1.40c. There are a few good inquiries for Structural Steel, but in the main the contractors are waiting for a price readjustment or for some other development in the trade. The Plate trade is quiet, and the Sheet business seems to be spasmodic. The small Sheet mills get current business by cutting the price and then withdrawing from the market temporarily when their immediate needs for business are met. The Rail situation has not changed. The demand for Light Rails is about satisned for the present and the inquiries on Standard Rails have not developed into any business. The market shows signs of weakening in Billets, the outsiders evincing a disposition to cut under pool prices from $1 to $3 a ton. Cleveland. The association price is $23.50, Cleveland.

Old Material.—The market shows a downward tendency, with prices in the main purely nominal. We continue to quote, all gross tons: Old Steel Rails, $13 to $14; Old Car Wheels, $13 to $14; Heavy Melting Steel, $13. All net tons: Cast Borings, $5 to $5.50; No. 1 Busheling, $11 to $11.50; No. 1 Railroad Wrought, $12 to $12.50; Wrought Turnings, $7 to $7.50; Iron Car Axles, $17 to $18; No. 1 Cast, $11 to $12; Stove Plate, $9.

M. Hersch has bought out the interest of S. W. Goldman of the firm of Goldman & Bialosky, thereby becoming the partner of Harry Bialosky. The new firm will be styled the M. Hersch Iron Company. They will carry on the Scrap Iron business at the same location, Canal street, Cleveland, Ohio.

Pittsburgh.

PARK BUILDING, May 18, 1904.—(*By Telegraph.*)

Pig Iron.—It is probable that the inquiry which the Lake Superior Company have out for 100,000 tons of Bessemer Pig Iron, to be used in rolling Rails and other material at their Steel plant at Sault Ste. Marie, may develop into some business. Reports have it that this company, who have taken over the plant of the Algoma Steel Company, have bought 50,000 tons of Bessemer from the Zenith furnace at Duluth, which is the nearest point of delivery to the Soo. It is said that other furnaces, some in the Valley, are figuring on an additional 50,000 tons. It is also stated that the same company are figuring on the purchase of 75,000 tons of Connellsville Coke. The scheme is to haul this Coke to Cleveland by rail and then by lake to the Soo, where it can be delivered right at the works. The general Pig Iron market continues quiet and hardly enough metal is selling to establish prices. Bessemer Iron is quoted at $12.75, Valley, with a sale of 500 tons reported, but a lower price would be made on any good sized tonnage. Basic Iron is held at about $12.25, Valley, or $13 to $13.10, Pittsburgh. Nothing is doing in Foundry Iron, except in small lots, and Northern No. 2 is held at $12.50 to $12.75, Valley. There has been some movement in Gray Forge Iron, three local consumers having bought upward of 2500 tons in the past week at about $12.50, Pittsburgh. The Wheeling Mold & Foundry Company, who have a Pennsylvania Railroad contract for 30,000 tons of Castings, have inquiries out for a large tonnage of Pig Iron, but so far have not bought. There is no doubt that a restriction of blast furnace operations will soon have to be made unless the demand for Pig Iron improves. The output is certainly ahead of the consumption, and some of the furnaces will have to pile their Iron or blow out. The Carnegie Steel Company have blown out one Edgar Thomson stack and the Neville Island stack, both of which have been working badly and will be extensively repaired.

Steel.—The Steel market continues very quiet, practically all the tonnage of Billets now moving being on sliding scale contract. Under these contracts the price of Bessemer and Open Hearth Billets ranges from $20 to $21, depending on carbons and other conditions of the contract. The official price of Bessemer and Open Hearth Billets is $23. Pittsburgh: long Sheet and Tin Bars, $24, and cut Bars, $24.50, all Pittsburgh delivery.

(*By Mail.*)

The week under review in the Iron trade has been quiet and without special feature. Some little interest is being caused in the Pig Iron market by a reported inquiry from the successors to the Algoma Steel Company, and known as the Lake Superior Company of Sault Ste. Marie, for 100,000 tons of Bessemer Pig Iron, to be used in the rolling of Steel Rails. So far but little attention has been paid to the inquiry and nothing may come of it. The Wheeling Mold & Foundry Company, who have a contract for about 30,000 tons of Castings for the Pennsylvania Railroad tunnel in New York City, are making some inquiries for Iron, but so far have not bought. There is an inquiry in the market for 500 tons of Low Phosphorus Iron to go to Lorain, and $18, Valley, has been quoted on this business. Bessemer Iron is nominally $12.75, Valley, or $13.60, Pittsburgh, and a warrant for 500 tons at that price was sold on the Pittsburgh Stock Exchange yesterday. It may be stated that a majority of the furnace owners are opposed to the listing of Pig Iron Warrants on the Stock Exchanges, believing it will have a tendency to demoralize the Pig Iron market by the introduction of Wall street methods in the sale of Pig Iron. New tonnage in Steel is light and there are reports of sales of Billets at $22, delivered in the Cleveland district, which is $1.50 a ton less than the official price. General demand for Finished Iron and Steel is somewhat quiet, but the mills are fairly busy on contracts which will keep them moderately busy until July 1. It is generally conceded that conditions in the Iron trade will be quiet during the summer months, but that a better demand may be expected in the fall. Railroad earnings up to this time show a decrease of about 10 per cent., as compared with last year, and this will probably have the effect of causing railroads to restrict purchases in the next three or four months, or until earnings show an increase. The immediate future of the Iron trade depends largely on the crops. If they prove to be heavy this year then we can reasonably expect a better business in the Steel trade in the fall months. As it is now there is no incentive for purchasers to make contracts, and they are buying from hand to mouth for actual needs. This policy is likely to be continued for some little time yet. We are advised of some heavy sales of Ore for this season's delivery on the basis of about $3.25 for Old Range and $3 for Mesabas. There has also been a good deal of Dock Ore sold, owing to the lateness of the opening of navigation.

Muck Bar.—The market continues exceedingly quiet, and we quote neutral Muck Bar, made of old Pig Iron, at $25.50, delivered. Some grades of Bar are offered as low as $24.50 to $25, delivered.

Skelp.—There is a fair inquiry for Skelp, and we are advised of a sale of 500 tons of Grooved Iron Skelp on the basis of 1.45c., Pittsburgh. We quote Grooved Iron Skelp at 1.45c. to 1.50c.; Sheared, 1.50c. to 1.55c., and Grooved and Sheared Steel Skelp at 1.40c., Pittsburgh.

Steel Rails.—No large orders for Steel Rails have been placed since our last report. On account of dullness in the Rail trade part of the Edgar Thomson Works is running on Billets. We quote at $28, at mill, for Standard Sections.

Structural Material.—Among contracts placed during the week was the tonnage for the South Side Terminal Warehouse, about 12,000 tons, which was divided between Carnegie and Jones & Laughlin Steel Company. The Wabash extension, being a Y from the main line to connect with the South Side mills and involving about 2000 tons, will be placed this week. The general situation in the Structural trade is a little better and a good many small orders are being placed, which give the mills a fair amount of work. The Manhattan Bridge, crossing the East River and involving 40,000 to 50,000 tons, is a prospective large contract, which the mills may be asked to figure on before long. We quote: Beams and Channels, up to 15-inch, 1.60c.; over 15-inch, 1.70c.; Angles, 3 x 2 up to 6 x 6, 1.60c.; Zees, 1.60c.; Tees, 1.60c.; Steel Bars, 1.60c., half extras, at mill; Universal and Sheared Plates, 1.60c.

Plates.—We are unable to confirm the report that large orders for Plates have been placed by the car interests. It is true that negotiations are under way by the Pennsylvania and Wabash railroads looking to the purchasing of a large number of Steel cars, but this business has not yet been placed. General demand for Plates is light, consumers still pursuing the policy of buying only for actual needs, instead of making contracts ahead. We quote: Tank Plate, ¼-inch thick and up to 100 inches in width, 1.60c., at mill, Pittsburgh; Flange and Boiler Steel, 1.70c.; Marine, Ordinary Fire Box, American Boiler Manufacturers' Association specifications, 1.80c., at mill, Pittsburgh; Locomotive Fire Box, not less than 2.10c., and it ranges in price up to 3c. Plates more than 100 inches in width, 5c. extra per 100 lbs. Plates 3-16 inch in thickness, $2 extra; gauges Nos. 7 and 8, $3 extra; No. 9, $5 extra. These quotations are based on carload lots, with 5c. extra for less than carload lots; terms net cash in 30 days. Above prices are for all points of delivery in the United States, except California, Oregon and Washington, which are not governed by the Association prices.

Sheets.—We note a moderate demand for Sheets, some mills reporting that inquiries are quite good and that they are entering a large amount of tonnage. Other mills say demand is only fair, buyers showing a disposition to place orders only for actual needs. In a general way it may be said that the Sheet mills are pretty well filled up to July 1 or later. We quote: No. 26 Black Sheets, box annealed, one pass through cold rolls, 2.05c. to 2.10c.; No. 27, 2.10c. to 2.15c., and No. 28, 2.20c. to 2.25c., f.o.b. at mill, for carload lots. Galvanized Sheets are held at 2.85c. for No. 26, 3.04c. for No. 27 and 3.23c. for No. 28, in carload lots, for ordinary specifications.

Bars.—There is no improvement to note in demand, either for Iron or Steel Bars, new tonnage for which is light and specifications on contracts are not coming in as fast as the mills would desire. The market on Iron Bars is slightly easier, some of the smaller mills having very little tonnage and are more disposed to shade prices to get business. Some of the large continuous Bar mills which can turn out a very heavy tonnage are not being operated to more than half capacity. We quote Iron Bars at 1.35c. to 1.40c., Pittsburgh, and Steel Bars at 1.35c., Pittsburgh, in carload and larger lots, with the usual differentials for less than carloads. On Open Hearth Bars $1 a ton advance is charged.

Hoops and Cotton Ties.—A moderate amount of tonnage is being placed, but the mills are running mostly on contracts placed some time ago. We quote Steel Hoops at 1.40c. and Steel Bands at 1.30c. to 1.35c., extras as per Steel card.

Merchant Pipe.—Demand for Tubular goods is fairly satisfactory, the leading mills entering a good deal of new tonnage and having a large number of contracts on their books which will require several months to fill. Stocks of Pipe in jobbers' hands are very light, this being indicated by the fact that almost invariably orders placed with the mills call for prompt shipment. In Line Pipe we may note a contract for about 2000 tons of 12 to 16 inch Pipe, placed by a local gas concern. The tone of the market is fairly firm, but a few of the mills are shading prices to some extent, depending on size of the order and deliveries wanted. Consumers' discounts in carloads, which are slightly shaded, are as follows:

Merchant Pipe.

	Steel.		Iron.	
	Black.	Galv.	Black.	Galv.
	Per cent.	Per cent.	Per cent.	Per cent.
¼, ⅜ and ⅜ inch	68	58	66	56
½ inch	71	61	69	59
¾ to 6 inches	75	65	73	63
7 to 12 inches	71	61	68	58
Extra strong, plain ends, ⅛ to 8 inches	67	57	64	54
Double extra strong, plain ends, ⅛ to 8 inches	59	49	56	46

Boiler Tubes.—Demand for Boiler Tubes is quite active, the railroads buying more freely than for some time. This is regarded as a favorable feature of the market, indicating that the railroads will probably be heavier buyers, not only of Boiler Tubes but of other products, in the near future than they have been in the past three or four months. Prices of Boiler Tubes are fairly firm, being shaded only in exceptional cases and for desirable orders. Discounts to consumers in carloads are as follows:

Boiler Tubes.

	Steel.	Iron.
1 to 1¼ inches	42½	39
1¾ to 2¼ inches	55½	38
2½ inches	58	43
2¾ to 5 inches	64½	50½
6 to 13 inches	55½	38

Merchant Steel.—Some contracts have been placed by agricultural implement makers and wagon builders, but most of these contain a provision that prices are guaranteed against decline. Specifications on contracts are coming in only fairly well. Demand for Shafting is quite active and prices are well sustained, there being almost an entire absence of cutting. We quote: Hexagon Steel Bars, 1.60c. for Bessemer and 1.65c. for Open Hearth; Plow Steel, 6-inch and under, 1.40c. for Bessemer and 1.45c. for Open Hearth; Plow Slabs, ¾-inch and heavier, 1.65c.; Tire Steel, smooth finish, ¾ x 3-16 and larger, 1.65c. flat; Toe Calk, 1.90c.; Carriage Spring Steel, 1.75c. Shafting is 52 per cent. off in carloads and 47 per cent. in less than carloads, delivered in base territory.

Tin Plate.—The heavy demand for Tin Plate noted in this report for some weeks past shows no abatement, and all the mills of the leading Tin Plate interest, as well as the independent concerns, are being operated to full capacity and are a good deal behind in shipments. In some cases slight premiums over the official price have been paid for prompt delivery. We quote 100-lb. Coke Ternes at $3.40 per box, Pittsburgh.

Spelter.—The market is weak and demand for Spelter is very quiet. We quote Prime Western Spelter at 5.05½c. to 5.08½c., f.o.b. Pittsburgh, for prompt shipment.

Iron and Steel Scrap.—There is so little doing in the Scrap market that it is almost useless to quote prices. About the only trading being done is between dealers who have contracts and sometimes exchange Material to fill them. We quote Heavy Melting Stock at $11.75 to $12 in gross tons, but do not hear of any sales in this market for some time. No. 1 Wrought Scrap is about $13, net; Malleable Scrap, $11.75 to $12, gross tons; Cast Iron Borings, $5.75 to $6, gross tons; Turnings, $7.50 to $8, gross tons, and Bundled Sheet Scrap, $9.25 to $9.50, gross tons, all f.o.b. Pittsburgh.

Coke.—There is a fairly active demand for both Furnace and Foundry Coke, and owing to the shutdown of the Coke ovens of a local interest, this concern came into the market recently and bought 125 cars of Coke a day, deliveries to run until the trouble is settled. The H. C. Frick Coke Company have about 11,000 ovens in the Connellsville region, of which about 8500 are in blast. It is stated this concern have recently bought Furnace Coke to fill contracts. The price of Connellsville Furnace Coke for prompt shipment ranges from $1.60 to $1.65, but there have been resales as low as $1.50 a ton. Connellsville 72-hour Foundry Coke is held at $2 to $2.10 at oven. Furnace Coke made outside of Connellsville region is being offered at $1.40 to $1.45 a ton and Foundry Coke at $1.85 a ton. Out of a total of 28,686 ovens in the Upper and Lower Connellsville regions 23,265 were active last week and 5421 were idle.

Birmingham.

BIRMINGHAM, ALA., May 16, 1904.

The Iron market the past week had nothing in it of an encouraging nature to the sellers. It was about as dull as was pictured the preceding week. There was almost a nominal market. At the opening of the week the price was on the basis of $9.75 for No. 2 Foundry, but the business was of very limited volume. The price was then lowered by one or more interests to $9.50 with the expectation that some activity would be induced. But the buyers interpreted the reduction as indicating weakness and retired to await lower values. There was some Iron sold at $10 for No. 2 Foundry, but the sales were restricted in volume and confined to the plugging of the small holes in fading stock piles. One interest, which is usually in the market when there is any demand for Iron, told your correspondent that they had received but one order during the week and that it amounted to only 100 tons, on the basis of $10 for No. 2 Foundry. There were a few sporadic orders for Iron of special analysis that brought $10.25 and up to $10.50, but in volume they were of no significance whatever. They were entirely of a retail character. The sales at $10 for No. 2 Foundry were of about the same character.

At $9.75 for No. 2 Foundry the trade showed no disposition to take hold and the price sagged to $9.50 without increasing the business to any appreciable extent. There are some who, at present, will not sell below $10 for No. 2 Foundry; but there are sellers enough at $9.50 and $9.75 to more than absorb the business offering. There is no active effort to secure orders at the inside values quoted, but the sellers are accepting the business, and some are willing to duplicate the business concluded. No. 3 Foundry is quoted at $9, with only a trifling business done. Gray Forge at $8.75 is going in a very limited way. When the close of the week came the market looked rather weak, and single car lots were sold at $9.50 for No. 2 Foundry.

Some of those closely identified with the Pipe trade have been figuring upon their business and have arrived at the conclusion that the Pipe companies have of late been melting about 25 per cent. more Iron than was the case last year, and the same can practically be said of the different car works. This is the only discernible piece of silver lining to the cloud of dullness that envelops the market. These Pipe interests may lead the buying when the move to cover requirements for the third quarter commences.

As stated in the last letter, there is no co-operation for the maintenance of values. It is a case of every man for himself when it comes to fixing values. The caution is again repeated that there is no large stock of Iron on hand in this district and that only a moderately active demand would soon reduce it to a point where enhanced values would be asked.

The Sloss-Sheffield Company, who announced some time ago that they were out of the market as sellers of Iron because of their heavy sales, now state that they have reentered the market for business for the months of June, July and August. It was current belief that they were pretty well sold on their output up to August. It is thought that the change in the policy of the company is influenced by the splendid results being obtained from their furnace practice, which now is more favorable than has ever heretofore prevailed.

There have been some labor troubles of late and all of them have not yet been settled. At the mines of the Tennessee Company at Blocton the miners are now idle because of a dissatisfaction with the superintendent, who is sustained by the officials of the company. There has been no regular strike ordered, but the miners have ceased all work and seem very resolute in their determination to carry their point. At the Bessemer Rolling Mills there is also a mis-

understanding and the mills are at present idle. But the opinion is that they will soon be settled and affairs again be normal.

The Birmingham Boiler Works were forced into bankruptcy the past week by some small creditors. For several months their plant has been gradually transferred to East Birmingham, and an effort was made to keep their business going at the same time their location was being changed. It is claimed by the officials that their assets will more than equal their liabilities and that a little stay in proceedings would have enabled them to overcome the difficulties besetting them.

The Lacey-Bueck Company have applied for permission to increase their capital stock to $750,000 at their option.

Concerning general business there is very little to say. It is more quiet than it was at the same time last year, but the outlook is all that could be expected.

The report of the Car Service Association shows that for the month of April the number of cars handled was 62,048, as against 64,041 for the same period last year. As this is Presidential year, the showing is considered to be a fine one.

The Birmingham Casting Works were destroyed by fire the past week. It was one of our newly acquired industries and it will probably be rebuilt without delay. We have been particularly unfortunate as to fires of late, some of them being of considerable magnitude.

The Belgian Iron Market.

BRUSSELS, April 30, 1904.

Belgium has now taken up resolutely the formation of syndicates. An agreement has been reached among the principal Belgian Pig Iron manufacturers which involves the formation of a selling bureau. This has been formed at Namur on the 7th of this month and has already begun operations. It was legally organized at Brussels on the 13th in the form of a stock company for the period of five years. The companies who belong to the selling bureau are the Société d'Athus, Bonehill, Marcinelle & Couillet, Monceau St. Tiacre, Moucherets, La Providence, Sud de Châtelineau, Thy-le-Château Marcinelle, Angleur, Ougrée, Cockerill and Esperance-Longdoz. Nominally the syndicate handles the sales of the entire production of the 12 syndicated companies both for Mill Iron and for Iron for Steel making purposes, the quantity involved being about 1,100,000 tons per year. Approximately the distribution of this tonnage is as follows:

	Tons.
Usines de Mouchert, Mill Iron	30,000
Sud de Châtelineau, Mill Iron	30,000
Bonehill, Mill Iron	50,000
Monceau St. Tiacre, Mill Iron	70,000
Ste. d'Athus, Mill Iron	90,000
John Cockerill, Steel Iron	225,000
Ougrée, Steel Iron	125,000
Angleur, Steel Iron	110,000
Esperance-Longdoz, Steel Iron	90,000
Thy-le-Château, Steel Iron	70,000
Couillet, Steel Iron	110,000
Providence, Steel Iron	110,000
Total	1,110,000

However, ten of these companies consume either the whole or a part of their own production, and some of them, like Providence, Ougrée and occasionally L'Esperance do not make enough Iron for their own requirements and must buy in the open market. These works need not render any accounting to the syndicate on that part of their product which they work up themselves. They may besides exchange among one another Pig Iron against intermediate products without the intervention of the syndicate. The latter, therefore, does not take hold except in the transactions between their members and outsiders, or, in other words, with the rolling mills. Only two furnace plants, Athus and Sud de Châtelineau, sell their whole product. The others are, therefore, only occasional sellers. As will be noted, the syndicate takes up only the sale of Mill Iron or Iron for Steel purposes; but, since it controls the sale for all its members, the selling bureau would handle what Foundry Iron would be made if the syndicated furnaces turned to that grade. The following furnaces are not members of the syndicate: La Louvière and Grivegnée, both making Mill Iron, and Musson and Halanzy, the two latter making Foundry Iron. Musson and Halanzy have made special arrangements with the syndicate.

The object of the syndicate is undoubtedly to raise prices, but necessarily in order to reach its aims it must have some understanding with the Loraine-Luxemburg syndicate and with the Longwy selling bureau. With the former negotiations have some chance, since the Iron makers of the Grand Duchy are favorable to an understanding. Such a Belgian-Luxemburg agreement would be profitable to all, and principally to the large export works like Rummelange and Rodange. So far as the Longwy syndicate is concerned it is difficult to judge whether negotiations will lead to a successful issue. It is true that the Longwy syndicate handles only the sales for the French home market, leaving its members free so far as exports from France are concerned. Under the circumstances it would be necessary to reach an understanding with each of the individual furnace plants, which would involve great difficulties. However this may be, it is considered certain that a rise of 50 centimes per ton will be effective on July 1, and that a similar increase in prices will be established on October 1.

So far as the negotiations are concerned which have been started with the object of forming a Belgian Steel Works Syndicate similar to the German Steel Works Syndicate, it may be stated that no definite results have yet been attained. This is due to the objections of the Société de Sambre et Moselle, who, owing to the recent installation of their plant, feel that they can claim a higher allotment than is granted to them. The company demand a monthly allotment of 17,000 tons, while the other Steel works do not offer more than 10,000 tons. It is probable that an agreement might be reached on a basis of 15,000 tons per month, but the other Steel works refuse to yield. However, now that Phœnix has entered the German Steel Works Syndicate it is believed that Sambre et Moselle will come into the Belgian Steel Works Syndicate earlier or later, amicably or under compulsion. Without this important plant the Belgian syndicate would have no chance of surviving. When it does enter the syndicate then there will certainly be some arrangement between the Belgian and the German syndicates to regulate the export business. Efforts will then be made to extend the understanding to the French Steel works of the Meurthe et Moselle district, who export a large share of their production.

The participation which has been arranged for among Belgian Steel works is as follows:

	Tons.
Ougrée	270,000
Cockerill	202,000
Angleur	140,000
Sambre et Moselle	120,000
Marcinelle et Couillet	108,000
Gustave Boel	108,000
Thy-le-Château	62,400
Total	1,152,000

There is a strong movement in Belgium to form a Wire syndicate. The Belgian Wire makers are engaged in a disastrous competition which is aggravated by the fact that the Nail mills are united in a syndicate and act in a body to obtain the best possible conditions in buying Rods. On the other hand the competition is very severe with the German Wire Rod mills which sell a large tonnage in our country. German Wire mills would have to reach an understanding with the Wire Nail makers and with the German Wire Rod syndicate. The director of the Belgian Wire Nail syndicate is in charge of working out a project for an agreement, the principal points in which are the following: The Belgian Wire Nail syndicate is to purchase in Germany a certain quantity of Wire Rods, buying the balance from the Belgian Wire Rod syndicate. Both the latter and the German Wire Rod syndicate would agree not to furnish any Rods to any new Wire Nail mill built in Belgium.

Business in the Iron industry in this country feels the favorable influence of developments in Germany. The agreement among the blast furnaces and the chance of an understanding among the Steel works has also contributed toward an improvement. Mill Iron is tending upward, the quotation being 55.50 francs, delivered Charleroi. Thomas Pig is selling at 62 francs. Foundry Iron, which during the last three weeks displayed a tendency toward a rise and which advanced in that time 50 centimes per ton, has suddenly jumped 2 francs, which is attributed to an understanding between the only two Belgian makers of Foundry Iron, Musson and Halanzy. To-day Foundry Iron is selling at 59 francs, f.o.b. furnace.

Old Material is actively inquired for and the large merchants are holding prices high. For good quality 67.50 francs is being paid.

Steel is rising. Prices are 95 to 96 francs for Blooms, 100 to 101 francs for Billets, and 105 to 108 francs for Slabs.

The market for Finished Products may be considered satisfactory, except possibly that export prices are complained of. This is due to the fact that there are still old contracts at low prices on which specifications have not yet been put in. Without these contracts the mills could easily raise prices, since work for the home market is ample, thanks to the development in the building industry this year. Beams are selling at 122.50 to 125 francs for the home market, but rarely go above £4 6s. for export. Merchant Bars are selling at 135 francs for the home market and £4 19s. to £5, f.o.b. Antwerp, for export. There is quite a heavy demand for them. The Sheet mills have very little work, and, owing to lack of orders, do not run at night.

Business in Wire products, which was quite animated some time past, has slackened considerably; the factories have less orders on hand and have been able to renew their contracts for Rods at a reduction, having secured 135 francs, as compared with 137.50 to 140 francs at the time of the last drawings.

Construction shops are well occupied. The orders from the Government alone contribute very largely to keeping the works busy.

New York.

NEW YORK, May 18, 1904.

Pig Iron.—The market is very dull and is weaker because of the lower offerings by both Southern and Northern makers. Founders are complaining bitterly that the volume of business which is coming to them is light and is not remunerative. We quote Northern No. 1 Foundry, $15.25 to $15.50; No. 2 Foundry, $14.75 to $15, and Gray Forge, $13.25 to $13.50, tidewater. Tennessee and Alabama brands are $13.25 to $13.50 for No. 2 Foundry and $12.75 to $13.25 for No. 3 Foundry.

Steel Rails.—A fair tonnage has been placed recently, the mills equalizing freights on what business is being taken. We continue to quote $28 at mill for Standard Sections and $23 to $25 for Light Sections.

Cast Iron Pipe.—The volume of business has latterly been diminishing, and inquiries are less numerous. The weakness in Pig Iron is mainly responsible for the falling off in orders, as buyers of Pipe expect to be correspondingly favored with lower prices if they wait. Prices on carload lots are about $28 per gross ton for 6 to 10 inch and $27 for 12-inch upward, at tidewater. Special prices are quoted on large lots.

Finished Iron and Steel.—So far as fresh contracts are concerned, the market this week appears to be almost devoid of news. In the Structural line the material has been purchased for a few buildings, but as far as can be ascertained business of this kind has been light. The mills are now endeavoring to make sales direct to small contractors, and this is affecting the business of the large fabricators of Steel. Nothing has developed in the line of bridge work and inquiries are few. The local Plate trade is still suffering from the restriction of business caused by the strike of the boiler makers, and practically no transactions are reported. Bar Iron is in a little better shape than other branches of the Finished Iron and Steel trade, but the demand in this line is less than it has been. The outlook at present is not particularly encouraging. We quote at tidewater as follows: Beams, Channels, Angles and Zees, 1.74½c. to 2c.; Tees, 1.79½c. to 2c.; Bulb Angles and Deck Beams, 1.84½c. to 2.05c. Sheared Plates in carload lots are 1.74½c. to 1.85c. for Tank, 1.84½c. to 2c. for Flange, 1.94½c. to 2.10c. for Marine, and 1.94½c. to 2.50c. for Fire Box, according to specifications. Refined Bar Iron and Soft Steel Bars, 1.49½c.

Old Material.—Transactions appear to be confined to very small quantities. Dealers are not inclined to commit themselves to any extent under present conditions, and consumers are holding off in the expectation of being able to buy cheaper. Another large lot of Relaying Rails is being offered by an Eastern road. It seems impossible at present to do anything with material of this kind, as such low bids are being made that the railroad companies will not consider them. Quotations are approximately as follows, per gross ton, New York and vicinity:

Old Iron Rails	$15.00 to $16.00
Old Steel Rails, long lengths	13.00 to 13.50
Old Steel Rails, short pieces	11.25 to 11.50
Relaying Rails	17.00 to 18.00
Old Car Wheels	11.50 to 12.00
Old Iron Car Axles	15.50 to 16.00
Old Steel Car Axles	14.00 to 14.50
Heavy Melting Steel Scrap	11.25 to 11.50
No. 1 Railroad Wrought Iron	12.75 to 13.25
Iron Track Scrap	11.75 to 12.25
Wrought Pipe	9.00 to 10.00
Ordinary Light Iron	7.00 to 7.50
Cast Borings	4.00 to 4.50
Wrought Turnings	6.75 to 7.25
No. 1 Machinery Cast	11.00 to 11.50
Stove Plate	9.00 to 9.50

Iron and Industrial Stocks.

The iron and steel stocks have passed through quite an unpleasant experience the past week. This appears to have been largely due to fresh liquidation in the United States Steel stocks. No cause for this was apparent, as trade news was not especially unfavorable, but for some reason an outpouring of stock came from quarters evidently having large holdings. The heavy selling began on Wednesday afternoon of last week, when the common sold down to a new low record of 9. This was not the limit of its fall, as on Friday and Saturday it touched 8⅜. The preferred was not forced lower than 51¼, which was reached on Saturday. The new 5 per cent. bonds sold down to 71⅝ on Tuesday of this week. Republic, Tennessee and Colorado stocks were forced down at the same time. On Tuesday afternoon and Wednesday morning the market showed a disposition to recover. The range of prices on active stocks during the week from last Wednesday until Tuesday of the present week was as follows: Can common 4 to 4¼, preferred 34¾ to 35½; Car & Foundry common 16¼ to 17, preferred 67 to 70; Locomotive common 17¼ to 18⅛, preferred 81 to 82; Cambria Steel 19⅛ to 19¾; Colorado Fuel 28½ to 30½; Crucible Steel common 4½ to 4⅞, preferred 35⅞ to 37½; Presserd Steel common 24¼ to 25¼, preferred 67 to 69; Republic common 6 to 6¾, preferred 37 to 39¼; Sloss-Sheffield common 36 to 37; Tennessee Coal 31⅝ to 34½; United States Steel common 8⅜ to 9¼, preferred 51¼ to 53⅛, new 5's 71⅝ to 72¾. The last sales of active stocks up to 1.30 p.m. on Wednesday were as follows: Car & Foundry common 16¼, preferred 69; Locomotive common 17½, preferred 81; Colorado Fuel 28½; Pressed Steel common 25¼, preferred 67; Railway Spring common 16¾, preferred 73; Republic common 6½, preferred 38⅝; Tennessee Coal 32½; United States Steel common 9⅛, preferred 52¾, new 5's 72¾; Sloss-Sheffield common 36, preferred 82.

Dividends.—General Electric Company have declared the regular quarterly dividend of 2 per cent., payable July 15.

The Wheeling Steel & Iron Company, Wheeling, W. Va., have declared the regular quarterly dividend of 2 per cent.

Metal Market.

NEW YORK, May 18, 1904.

Pig Tin.—Until yesterday, when a halt was called and recovery set in, the market had been declining steadily. On Monday prices had reached as low as 27.50c. here and £123 in London. A slight buying movement then set in and immediately prices began to take an upward turn. Although the advancing quotations put a stop to the buying movement, prices continued to stiffen. By closing time to-day values had recovered sufficiently to occupy a position somewhat higher than they were a week ago. The closing figures were as follows: Spot, 27.87½c. to 28.12½c.; May, 27.80c. to 28c., and June, 27.50c. to 27.75c. The London cable named a considerable advance over last week, also with £126 for spot and £125 2s. 6d. for futures. The arrivals thus far this month amount to 1690 tons, while the afloats aggregate 3329 tons.

Copper.—A sharp reduction in prices has been made with a corresponding decline noted in the London cables. The market is somewhat easier as a result, and consumers are persisting in holding out. There is so little inquiry that the figures made by the producers and posted on the New York Metal Exchange may be taken as the fairest representation of the market. These figures are now as follows: Lake, 13.12½c. to 13.25c.; Electrolytic, 13c. to 13.12½c.; Casting, 12.62½c. to 12.87½c. Both spot and futures are cabled from London at £57 2s. 6d. Best Selected has declined 10 shillings to £62 5s. The exports so far this month aggregate 8500 tons.

Pig Lead.—Demand is not active, purchasing being on a rather light scale and confined almost wholly to spot, which is still rather scarce. The market at the close was more or less easy, but with prices unchanged. Spot is quoted in New York, from store, at 4.60c. to 4.65c. The American Smelting & Refining Company continue to quote on a basis of 4.50c. for 50-ton lots of Desilverized, shipment within 30 days. Shipments can be had for 4.50c. St. Louis telegraphs 4.37½c. to 4.40c. London cables to-day show a further decline to £11 16s. 3d.

Spelter—Is lower and easy, with a moderate demand and no pressure to sell. Spot and May shipments are quoted at 5.15c. to 5.20c., New York. June is quoted 5.10c. to 5.15c. Western shipments are offered at 5.20c. St. Louis is easy at 5c. London cables show a decline to £22 2s. 6d.

Antimony.—There has been a general reduction in prices. Cookson's is offered at 7.75c., Hallett's 7c., and others 6.25c. The demand is very slight.

Nickel.—The usual amount of business is passing and prices are firm, large lots being quoted at 40c. to 45c. and smaller quantities at 50c. to 60c.

Quicksilver.—The market is quiet, with ample stocks and a demand of moderate proportions. Flasks of 76½ lbs. are quoted at $45. The London price to-day is £8 2s. 6d.

Tin Plate.—The market is unchanged, with a fair demand reported. Quotations are very firm, on the basis of $3.45 per box for 14 x 20 100-lb. Cokes, f.o.b. mill, equivalent to $3.64, New York. The Welsh market is unchanged at 11 shillings 7½ pence, f.o.b. Swansea.

The Clairton Sale.—It will not be possible to complete the preparation of the papers in time to transfer the Clairton Steel Company's property to the United States Steel Corporation on May 20, as expected. The formal transfer of the property will be made next week. The Crucible Steel Company have made an arrangement to pay the creditors of the Clairton Steel Company one-third of their claims in cash and the balance in six and twelve months' notes, with interest.

Founders' Day exercises at the Schwab Manual Training School, at Homestead, Pa., were held on May 16. Specimens of mechanical work, drawings and pyrography were shown as the result of the labors of the pupils. C. M. Schwab was not present.

PERSONAL.

J. C. McQuiston, formerly secretary of the Westinghouse Companies' Publishing Department, Pittsburgh, has been made superintendent and the responsible head.

Henry P. Richardson has resigned as president and general manager of the Glen Mfg. Company, Ellwood City, Pa., and established a manufacturers' agency for a line of light and heavy ornamental steel lawn fences, with headquatrers at New Castle, Pa.

Andrew Mellon, a well-known capitalist of Pittsburgh, is mentioned as a probable successor to Charles M. Schwab, as a director of the United States Steel Corporation, in case the latter resigns in July, as reported.

Henri Benedictus of Antwerp, Belgium, an importer of American machinery and hardware, expects to arrive at New York on the 23d for a stay of about four weeks, during which time communications to him should be addressed care of Henry W. Peabody of New York. Mr. Benedictus will visit Chicago, Cincinnati, St. Louis, Cleveland and other cities.

H. V. Croll, who has for several years been in charge of the office of the Allis-Chalmers Company at Salt Lake City, Utah, and who was before that the representative of the E. P. Allis Company at Spokane, Washington, has been appointed to the charge of the Allis-Chalmers office in San Francisco, 623 Hayward Building, as the successor of Geo. Ames, who has resigned.

Richard Lindenberg of Remscheid-Hasten, Germany, a director of the R. Lindenberg Soehne Steel Works, is now in this country.

Ralph B. Phillips has been elected treasurer and general manager of the American Steam Gauge & Valve Mfg. Company of Boston, Mass., and Henry B. Nickerson, secretary and assistant manager, to fill the vacancies caused by the death of their late manager, J. L. Weeks.

Wm. H. Binnian, president of the Acme Harvester Company, Peoria, Ill., has resigned from that company, his resignation to take effect June 1. He will remove to New York to engage in other business.

OBITUARY.

ARIEL L. THOMAS, who is credited with having manufactured the first box stove, died May 4 in Colrain, Mass., aged 87 years. He was a native of Colrain. For many years he conducted a foundry at Foundry Village, in Colrain, as a member of the firm of Thomas & Gleason, and later by himself. His box stove was taken up by other manufacturers, there being no patent upon it, and in its development became an important industry, but not in Colrain, where the foundry was finally abandoned.

HENRI VAN ZELM, a member of the firm of Woland & Van Zelm of New York, manufacturers of scales and weights, died May 13, at his home in New Rochelle, N. Y., aged 68 years. He was born in Holland and had patented many types of scales.

A Standard of Moisture In Molding Sand.

A large consumer of molding sand in New England is agitating the establishment of a standard basis of moisture in molding sand with a view to ending the constant differences which arise between consumers and owners of vessels transporting this material, and which sometimes occur between the dealer and the consumer. The trouble is an old one. Especially troublesome is it where sand is shipped by water. The material will absorb a large amount of moisture, and the leaving open of a hatch in damp weather will materially increase the tonnage.

In New England the usual freight rate is $1.75 a ton, and consumers dislike very much to pay freight on water. One recent shipment contained 27 per cent. of water. Occasionally the sand is of the consistency of a soft mud, which means an even higher percentage. The customer pays the freight per tonnage at the dock in the case of a water shipment. One adage is: "Kick the sand, and if it sticks to your shoe kick the skipper." The presence of water also means a larger price for the sand, or an extra $1 a ton for water, in addition to $1.75 for freight of water. When loaded dry on the cars there is generally little trouble, but sometimes the foundrymen claim it is not loaded dry.

What the standard percentage of moisture should be has not been stated. Probably the dealers would welcome a fixed percentage, if a practicable method of testing could be established, for the trouble between them and their customers is welcome to neither. The foundrymen would doubt the statement that skippers of coasting vessels would be glad to see a standard test, for these skippers are often accused, doubtless many times unjustly, of purposely lifting hatches when the humidity of the atmosphere is high.

New Publications.

Wheel Gearing. Tables of pitch line, diameters of wheels, proportions, strengths of teeth, &c. Publishers, Spon & Chamberlain, 123 Liberty street, New York. Cloth bound. Pocket size. Pages, 175. Price $1.

This book contains tables relating to wheels, which have been compiled by Alfred Wildgoose and Andrew J. Orr. Its purpose is to save much of the time which would be required by engineers and others in making calculations, and it is therefore expected to be specially useful in designing machinery. The tables comprise the following: Pitch line, diameters of wheels, proportions and dimensions of cut wheel teeth, proportions and dimensions of cast wheel teeth, strength of wheel teeth, horse-power of cut wheel teeth, horse-power of cast wheel teeth, angles and outside diameters of bevel wheels, natural sines and cosines, and a table of the fractional parts of an inch, with corresponding decimals. The proportions of wheel teeth are those generally adopted by engineers, and the various dimensions for each pitch have been tabulated in convenient form.

Care and Handling of Electric Plants. By Norman H. Schneider. Publishers, Spon & Chamberlain, 123 Liberty street, New York. Cloth bound. Pocket size. Pages, 104. Price $1.

This work is a manual on the care and handling of electric plants, written for the practical engineer by Norman H. Schneider, Fort Hamilton, electrical expert of the Southern Artillery District of New York. It is particularly intended for those who are called upon to operate a commercial or military electric plant without having had previous experience, but it will also be found to contain much of value to the engineer. The author states that it is written with the aid of notes actually obtained in handling the apparatus described, the chapter on incandescent lamps being specially notable. The contents are divided into six chapters, dealing respectively with the electric current, dynamos and motors, electrical measuring instruments, the storage battery, the incandescent lamp and the management of the oil engine. It is a thoroughly practical work, full directions being given for the proper management of apparatus, while profuse illustrations assist in their correct understanding.

The Milwaukee branch of the American Society of Mechanical Engineers completed its organization on May 10 with the election of a council to direct the affairs of the organization, consisting of M. A. Beck, E. P. Worden, G. P. Dravo, L. G. Knox and L. M. Jenkins. W. C. Starkweather was elected secretary-treasurer. The organization was formed for technical and social purposes, and while only members of the A. S. M. E. are eligible to active membership, any one interested in technical or engineering pursuits may become an honorary member. About 25 of the 60 Milwaukee members of the national association were present at the last meeting.

The Philadelphia Tin Plate and Jobbers' Association held a special meeting last week, following the death of Clarke Merchant of Merchant & Co., Incorporated, for the passage of resolutions of condolence with the family of the deceased.

The New York Machinery Market.

NEW YORK, May 18, 1904.

In our issue of last week reference was made to the visit which is being paid to this country by H. Schutte of the well-known German machinery house of Schuchardt & Schutte. Owing to the fact that this concern have on foot a project looking toward a wide expansion of their business policy the visits of Mr. Schutte to machinery builders will doubtless be received with a great deal of interest. The history of the success of this concern in exploiting American machine tools throughout Continental Europe is a most remarkable one, dating back but a little more than ten years. It is a story of two energetic, enterprising young salesmen who perceived the superiority of American machine tools, and foreseeing a demand for them in Europe took it upon themselves to satisfy that demand. So successful were they in this that to-day they hold exclusive agencies for many of the most prominent machine tool builders in this country, and operate a series of machinery houses throughout Europe which rank first among establishments of a similar nature.

It is now the purpose of the firm to extend their efforts so as to eventually cover every country on the globe. The headquarters for this world-wide agency system will not be in Berlin, however, but will be located in New York. It is, in fact, located here, for a special office has been opened at 120 Liberty street, where the work of the department has been begun. It is styled "Department S" and is under the management of Mr. Mueller, who was formerly the manager of the regular New York office of the company at the same address. The latter office is now being conducted by T. Marburg, and in this connection it might be stated that the European business will be carried on exactly as heretofore. We are informed, in fact, that the regular business of the company throughout Continental Europe will be operated separate from the new branch and will be conducted by Mr. Schutte. The supervision of the new branch of the business will come within the direct province of Mr. Schuchardt, who, we are advised, will hereafter confine his efforts exclusively to this work. So far as we are able to learn at this time, the purpose of "Department S" is to secure the representation of American machinery for all other countries than those in Continental Europe. The same methods will be pursued in gaining a foothold in these countries as those employed by the firm in establishing their European business. Mechanical engineers having had special practical training in the use and building of the machines they are to sell will be sent into the new fields. It is believed that the American machinery builders will be glad to avail themselves of the services along the proposed lines, as at present their business with foreign countries is oftimes very unsatisfactory owing to the lack of mechanical knowledge on the part of those employed by the general export houses who attempt to sell their wares. In the case of the latter concerns their machinery business constitutes but a very small part of their trade and hence receives but proportionate attention. With Schuchardt & Schutte, however, it is their whole mainstay, and they are specialists in this line to a high degree.

Another feature of the work of "Department S" will be the selling of machinery in this country. The plans for this branch do not seem to be very thoroughly worked up as yet, however. Mr. Mueller stated to a representative of *The Iron Age* that nothing will be sold here that will tend to antagonize the interests of the firm's American clients, but if any of the concerns whose products they are selling for export wish them to handle their machinery for the New York market they will undertake it, and may in time extend their operations over the entire country.

Plans have been completed and estimates are being received by the Pennsylvania Railroad Company for the construction of the group of new buildings to be erected at Milham Junction, near Trenton, N. J. The contract has been let for the foundations of the buildings composing this plant, which will consist of an erecting and machine shop, 191 x 361 feet; blacksmith shop, 80 x 260 feet; wood working and paint shop, 81 x 182 feet; paint and oil house, 52 x 82 feet; office and store house, 52 x 122 feet, two stories and basement; lavatory and locker building, 32 x 82 feet.

A traveling crane and some wood working machinery are required by the York Mfg. Company, York, Pa., who are erecting a new pattern shop and an addition to their foundry. This equipment is about all that the company have decided upon at the present time, and it is probable that when their plans are further matured they will be in the market for considerable more machinery. The York Mfg. Company are large manufacturers of ice making and refrigerating machinery.

Some little equipment is being purchased by Julian Scholl & Co., mechanical engineers, 126 Liberty street, New York, who have purchased the Diamond Truck Company's plant at Kingston, N. Y., which they are fitting up for the manufacture of road making machinery. The plant is pretty thoroughly equipped for the firm's needs and there will not be very much additional machinery required.

Complete shop equipment is required by the Hagan Gas Engine & Mfg. Company, Winchester, Ky. The company were recently incorporated with a capital stock of $75,000 and have purchased a site upon which they will erect a plant as soon as possible.

The Stephen Richard Company, Southbridge, Mass., manufacturers of knives and blades, are to double their factory, adding another story to their one-story building. The building is 62 x 25 feet. The company are in the market for several new grinding machines. The business is an old one, having been established 42 years ago by Stephen Richard, president of the corporation.

As was noted in these columns two weeks ago, the real estate, buildings and equipment of the insolvent Structural Steel Car Company at Canton, Ohio, were purchased by W. C. Laiblin, secretary and treasurer of the Canton Bridge Company, for $29,250, who will offer it for sale as a whole or in part. The plant, which is practically a new one, having been erected and equipped within the past two years, would make an excellent foundry, and is especially adapted for structural steel and bridge work. It consists of about 33 acres of land, upon which there is a main building, 78 x 506 feet; forge shops, engine and boiler rooms, paint shop, and a large and commodious office building. The shop buildings are constructed of tile and brick, with steel columns and roof trusses. In the main building there is a 12-ton electric crane, running the full length of the shop. The engine and boiler rooms are equipped with two 20 x 36 Corliss engines of 250 horse-power each, Bass vertical water tube boilers, two Laidlaw-Dunn-Gordon 16 x 24 and 15 x 28 duplex air compressors, one 500 horse-power open feed water heater, and three cold and hot water pumps.

Tenders will be received by the Bureau of Insular Affairs, War Department, Washington, until June 27, for the insular cold storage and ice plant at Manila, Philippine Islands. No bid for less than $1,000,000 will be received, and bidders are required to deposit 5 per cent. of the amount. For the fiscal year 1903 this plant earned gross $332,194, and its operating expenses were $198,339. The equipment was mostly built by the De La Vergne Refrigerating Machine Company, New York.

Notice is being sent to the trade that J. E. Snyder has taken into partnership with him his son, Milton C. Snyder, who has been actively engaged with him for several years in his business of manufacturing vertical drilling machinery at 100 Beacon street, Worcester, Mass. The business will hereafter be conducted under the name and style of J. E. Snyder & Son.

We have received official notification to the effect that the Canadian business of the Allis-Chalmers Company, who recently acquired the Bullock Electric Mfg. Company of Cincinnati, will hereafter be conducted by a new organization bearing the name Allis-Chalmers-Bullock, Limited. The works and principal offices of this important new Canadian company are in Montreal.

Proposals will be received at the Bureau of Supplies and Accounts, Navy Department, Washington, until June 11 for supplies for the Mare Island and Puget Sound navy yards, including a quantity of machine tools, comprising motors, shears, lathes, drills, grinders, shapers, key seater, wheel press, punches, centrifugal blower, exhaust fan, vertical pumps, &c.

The Bureau of Supplies and Accounts, Navy Department, Washington, will receive bids until June 14 for the following supplies for the navy yards at Portsmouth, N. H.; Boston, Mass.; New York; League Island, Pa.; Washington, D. C., and Norfolk, Va.:

Class 1. One 36-inch triple geared engine lathe, with 12-foot bed.
Class 2. One 18-inch engine lathe, with 10-foot bed.
Class 3. One 21-inch engine lathe, with 8-foot bed.
Class 4. One 14-inch engine lathe, with 6-foot bed.
Class 5. One 14-inch engine lathe, with 8-foot bed.
Class 6. One 13-inch engine lathe, with 5-foot bed.
Class 7. One 19-inch engine lathe, with 12-foot bed.
Class 8. One 19-inch lathe, with 8-foot bed.
Class 9. One 6-inch cutting off lathe.
Class 10. One automatic wood turning lathe, capable of forming material up to 44 inches in length.
Class 11. One motor driven pipe cutting and threading machine, capacity from 1 to 4 inches.
Class 12. One pipe threading and cutting machine, with adjustable expanding chasers for 1¼ to 6 inch pipe.
Class 13. Three 4-iuch pipe machines, motor driven.
Class 14. One rivet machine.
Class 15. One No. 4 single punching and shearing machine.
Class 16. One No. 3 turret head bolt cutting machine.
Class 17. One carving and molding machine.
Class 18. One tenoning machine.
Class 19. One improved band saw machine.
Class 20. One improved quick acting jig or scroll saw.
Class 21. One power hack saw.
Class 22. One power feed railway cut off saw.
Class 23. One heavy automatic railway cut off saw.
Class 24. One automatic circular saw sharpener.
Class 25. One No. 1 patent band sawing machine.

Class 26. One new automatic band saw filing and setting machine.
Class 27. One double revolving rip and crosscut saw.
Class 28. One slate sawing machine.
Class 29. One 300-ton wheel press.
Class 30. One automatic wire straightening and cutting machine.
Class 31. One 4½-inch cutting off machine.
Class 32. One automatic gear cutting machine, to cut gears up to 62 inches diameter and 12 inches face.
Class 33. Two combination shaping, edging, surface molding and carving machines.
Class 34. One improved sanding machine, 30 inches wide.
Class 35. One single punching machine, with 36 inches depth of throat, capable of punching ⅞-inch hole through ⅞-inch thickness.
Class 36. One 6 x 80 inches thread milling machine.
Class 37. Two stanchion pipe benders for 1 to 4 inch pipe.
Class 38. One set heavy bending rolls, to bend plates 24 feet in length and 1 inch thick.
Class 39. One heavy double planer and matcher.
Class 40. One heavy combined buzz planer, with side jointer attachment.
Class 41. One 24-inch crank planer.
Class 42. One universal grinding machine.
Class 43. One automatic knife grinder.
Class 44. One No. 2 universal surface grinder.
Class 45. One No. 1 universal cutter and reamer grinder.
Class 46. One grinding machine, surface 36 x 14 x 11½ inches.
Class 47. One automatic knife grinding machine.
Class 48. One universal grinding machine.
Class 49. Two electrically driven sensative drills, to drill to the center of 12 inches and up to ⅝ inch diameter holes.
Class 50. Two 22½-inch upright drills, with motor drive.
Class 51. One improved friction drill, with 20-inch swing, capacity for drilling up to 1⅛ inches diameter.
Class 52. One 3-foot plain radial drilling machine.
Class 53. One 14-inch crank pillar shaper.
Class 54. One 24-inch back geared combination crank shaper.
Class 55. One 10-ton revolving crane.
Class 56. Two electrically driven centrifugal pumps, with capacity of 150 gallons per minute.
Class 57. Four 350 horse-power wrought steel sectional boilers.
Class 58. One elevator.
Class 59. Three dust collecting systems.

The contract for the 100-ton shears at the Boston Navy Yard has been awarded to the Morgan Engineering Company, Alliance, Ohio, at their bid of $18,250.

H. F. Frevert, who for a number of years has been very well known in the New York machinery trade and until a few weeks ago was manager of the miscellaneous machinery department of the Niles-Bement-Pond Company, has opened offices at 114 Liberty street, New York, where he will conduct a machinery business under his own name. He has been retained as New York representative by the Brightman Mfg. Company of Shelby, Ohio, and the Norton Grinding Company of Worcester, Mass. He will also sell a general line of machine tools.

The Consolidated Lake Superior Reorganization.

Nine of the 12 directors of the new company to succeed the Consolidated Lake Superior Company have been elected as follows: J. Tatnall Lea, president of the First National Bank, Philadelphia; Charles H. Hinchman, a Philadelphia capitalist; Francis B. Reeves, president of the Girard National Bank, Philadelphia; John G. Terry, vice-president of the Mercantile Trust Company, New York; Charles P. Orvis, president of the Canadian Improvement Company, New York; Dumont Clarke, president of the American Exchange Bank, New York; G. B. Turrell, president of the Mutual Trust Company, Orange, N. J.; C. D. Warren, president of the Traders' Bank, Toronto, and Thomas J. Drummond, Montreal. Four are to represent the interests of the Philadelphia shareholders and bankers, four to represent the bankers and stockholders in New York and four to represent the Canadian interests.

It has been decided to have the main office of the company in Toronto, with a branch in New York. During the week a charter will be obtained under the New Jersey laws, after which the other directors will be elected and offices will be formally selected. It is practically settled that C. D. Warren will be president of the new company and Thomas J. Drummond vice-president. Cornelius Shields will be general manager, without any financial management. The time for depositing stock expired at 3 p.m. on May 17.

New Regulations for Drawback on Tin Cans.

WASHINGTON, D. C., May 17, 1904.—The Treasury Department is endeavoring to harmonize the practice at the various ports in calculating the amount of drawback to be allowed upon the exportation of tin cans manufactured from imported tin plate. In carrying out this purpose a new regulation has been prescribed, which will be enforced at all ports, as follows:

"On the exportation of tin cans manufactured with the use of none but imported tin plate a drawback will be allowed, based on the imported tin plate so used, less the legal deduction of 1 per cent. The preliminary entry must show the marks and numbers of the shipping packages and the name and number of each size and shape of can in each package, and in the entire shipment as such cans are specified in the manufacturers' officially verified sworn statement, which must be on file at the port of exportation.

"The drawback entry must show the number of cans of each kind and size in each package and in the entire shipment, the number of sheets of each size of imported tin plate withdrawn from stock for the manufacture of each kind and size of can, with unit weights in pounds of such sheets, and must give the following data under the symbols as indicated for each item:

x = total weight, in pounds, of imported tin plate withdrawn from stock as above.
y = total weight of such withdrawn imported tin plate which has gone into consumption, expressed in pounds.
z = total weight, in pounds, of imported tin plate in the exported cans.
v = value of the total weight of waste (x, y, z) at the works at the time of manufacture.
v' = value at the works at the time of manufacture of such waste in condition as imported—that is, before cutting.

"The application of the liquidation formula, post, must appear on the drawback entry, and, in addition to the usual averments, said entry must show that the cans covered thereby were manufactured of the materials and in the manner specified in the manufacturers' sworn statement, filed as required herein.

"In liquidation, the amount of imported tin plate which may be taken as the basis for the allowance of drawback may equal the quantities actually exported, after official verification. An allowance may be made for valuable wants in proportion to the depreciation in value of the tin plate in going to waste. Importations of tin plate will be charged with the quantities of tin plate withdrawn from stock, but no allowance will be made for so much thereof as goes into consumption.

"By way of illustration, the drawback d to be allowed on any particular shipment of cans for the manufacture of which x pounds of imported tin plate have been withdrawn from stock, duty paid being c dollars, y pounds thereof having gone into consumption, $x\ y$ pounds having been actually used in the manufacture of the cans which weigh z pounds, the total waste being worth v dollars at the works at the time of manufacture, and the weight of such waste in the uncut condition being worth v' dollars, is to be determined by substituting in the following formula the verified values of the symbols and solving for d:

$$d = 0.99c.\left(\frac{v'\,(x-y) - v\,(x-y-z)}{v'\,x}\right)$$

"All previous regulations covering the same class of merchandise are hereby revoked." W. L. C.

National Tube Company Inspection.—This week officials of the National Tube Company are inspecting the plants in the Pittsburgh and Valley districts. Next week the plants in the Eastern District will be inspected. Particular attention will be paid to the National Works, at McKeesport, where very large improvements are to be made and new mills erected. This is the semiannual inspection of the company, and is being made by the following named officials: W. B. Schiller, president; Edward Worcester, first vice-president; John D. Culbertson, second vice-president and treasurer; Taylor Allderdice, third vice-president; Peter Boyd, superintendent; Charles Patterson, mechanical engineer; J. H. Nicholson, third vice president Shelby Steel Tube Company; S. M. Lynch, purchasing agent, and J. F. Townsend, traffic manager.

Labor Notes.

There has been a readjustment of wages at the United States Armory at Springfield, Mass., by which men who do piecework have been cut down so that they will not make more than 50 cents a day above the regular day rate for the same sort of work. The day's pay on piecework has run as high as $1 above the daily wage, and the management of the Armory have decided that the new army rifle being manufactured there is costing too much for that reason. Various things were taken into consideration in coming to the new basis of pay. The tariff on piecework is based on the day rate of wages paid in the Armory, which varies from $1 for unskilled boys up to $3, the average rate for a first-class man being $2.60. This is for an eight-hour day, of which 90 minutes are allowed for preparation of work, sharpening tools, &c. The actual work is 6½ hours. The men are allowed 7 holidays and 15 days for vacations, for all of which they are paid. All this was considered in determining the new traiff for piecework. The Armory officers consider that if a workman earns 50 cents a day on piecework above such a scale of day wages he is doing pretty well.

The Saturday half holiday will be more general than ever in New England this year, owing to the condition of business, though some concerns who are busy enough to desire to run the full six days are conceding the half day Saturday. In not a few instances employees will have a full Saturday holiday during the warm months.

A meeting of the American Charcoal Company was held in Buffalo, N. Y., May 11, for the purpose of discussing the terms of the proposed new contract with the Manufacturers' Charcoal Company and for the election of directors; but, after discussion, the matter of renewal was left in the hands of the directors of the Manufacturers' Charcoal Company for action to be taken at a meeting to be held within two weeks at Bradford, Pa. The election of directors of the American Company was also postponed until after the Bradford meeting. The present contract with the Manufacturers' Company expires January 1, 1906. The contract to be signed will prolong the life of the American Company four years. If not renewed the American Company may be dissolved.

The preliminary injunction restraining striking employees of the Phœnix Iron Works, Meadville, Pa., from establishing pickets, has been dissolved by the Court. The men are restrained only from intimidation and coercion.

The strike at the Harrisburg Rolling Mill Company's plant, at Harrisburg, Pa., has been broken, and the men have, in part, returned to work. The places of the others have been taken by nonunion men. The men struck for recognition of the union.

The employees of all departments of the American Brass Company have been given a Saturday half holiday with pay where the employee has worked his full 55 hours, the order going into effect to include this week and continuing until the middle of October. In this matter the company are continuing a custom already inaugurated.

Structural iron workers employed in New Haven, Hartford, Bridgeport and Derby, Conn., went on strike on May 17, because of the refusal of their employers to grant a demand for a reduction in working hours from nine to eight, and an increase in wages of from 45 to 50 cents an hour.

The New York, New Haven & Hartford Railroad have settled the differences existing between them and their machinists, blacksmiths and other crafts employed in their shops by a readjustment of wages, together with the nine-hour day and other concessions already announced. The new wage schedule means no general advance in wages, but in a complicated readjustment resulting from an overhauling of the payroll a few men will get more and none less than the rate per hour which prevailed in each instance under the ten-hour basis. The strike of the company's boiler makers is still on. The strikers' places have been filled, and it is understood that the railroad will treat the men as individuals if they are taken back.

The National Association of Manufacturers.

PITTSBURGH, PA., May 18, 1904.—*(By Telegraph.)*—The ninth annual convention of the National Association of Manufacturers met in Carnegie Music Hall, Pittsburgh, on Tuesday morning, May 17. It was expected that 600 members would be in attendance, but at the opening session only about 300 were present. Additional members arrived during Tuesday, and at the opening session on Wednesday morning about 400 were present.

The session on Tuesday morning was called to order by D. C. Ripley, chairman of the local committee. An address of welcome was delivered by W. B. Rodgers, City Solicitor of Pittsburgh, representing Mayor W. B. Hays, who was unable to be present. An address was also delivered by James W. Brown, who represented the Pittsburgh Chamber of Commerce. It was expected that Governor Pennypacker of Pennsylvania would be present to speak to the assemblage, but he could not come, and he was represented by General Thomas J. Stewart, who made an address of patriotic nature, dwelling on the valor, industry and progress of the people of the State of Pennsylvania. After these preliminaries the annual address of President D. M. Parry was made, at the conclusion of which the annual report of Secretary Marshall Cushing was presented, which showed the total membership of the association to be 3003. The report of Treasurer F. H. Stillman was then read, showing receipts of $142,396.05 and expenditudes of $139,414.63, leaving a balance of $2881.42.

Owing to the late arrival of members, the Tuesday afternoon session did not convene until after 3 o'clock. About the only business transacted at this session was the adoption of a resolution recommending to Congress the establishment of a tariff and reciprocity commission, to be a bureau of the Department of Commerce, as follows:

Resolved, That the National Association of Manufacturers recommend to Congress the establishment of a tariff and reciprocity commission, a bureau of the Department of Commerce, to investigate and report to Congress and to the President the effect of tariff changes; that Congress establish maximum and minimum tariff rates and authorize the President to change, by proclamation within its limits, the tariff to carry reciprocity treaties, to oppose unfair combinations or unfair trade or commerce in this country or between this country and foreign countries.

At the afternoon session C. N. Fay of Chicago read a paper on "Strike Insurance." George J. Seabury of New York presented a paper on "Our Present and Future Needs for Expanding Commercial Supremacy," and John Kirby of Dayton, Ohio, read a paper entitled "Closer Relations of Forces Opposed to Socialistic Unions."

It is probable that the next annual convention will be held at Atlanta, Ga., although invitations have been received from New York, St. Louis and San Francisco.

On Tuesday evening a reception and ball was tendered the visitors by the Pittsburgh Reception Committee, at which about 500 persons were present. The sessions on Wednesday will be given over to the reading of papers by members and reports of committees. On Thursday the members will visit important manufacturing plants in the Pittsburgh district.

The United States Steel Corporation are about to blow out the two Cleveland furnaces of the American Steel & Wire Company, which are to be rebuilt from the ground up. No. 1 furnace, at the Ohio works at Youngstown, is to blow in after being reduced in hight from 106 feet to 90 feet. The new No. 4 furnace will soon start. The first of the new furnaces at Lorain, Ohio, is approaching completion, and the second will follow in a few months.

HARDWARE.

IN the current discussion of catalogue house methods and their relation to the Hardware trade a few manufacturers are known to be in an attitude of uncompromising opposition to the disturbing influences, but the great majority of them are observers rather than participants in the movement. This is natural, and for this conservatism they are not to be called to account too bluntly. It is a comparatively easy thing for a distributer of goods, such as the jobber or the retailer, to oppose a channel of distribution which diminishes his trade. He is simply fighting competition, a thing to which he is accustomed by his instinct and training as a merchant. It is not so with the manufacturers. When they oppose the catalogue houses they are opposing their customers, and if they refuse to sell them goods it is closing one of the channels through which their products are being marketed. The action of the jobber and the retailer in opposition to the new distribution is easy to understand. It does not call upon the retailer to sacrifice any business and holds out the promise of gaining trade that is slipping away from him. The jobbers who have been supplying catalogue houses are, if sincere in their opposition, put in a new relationship to them which may involve some loss of trade if they refuse out and out to sell them at all. But this loss of trade they may justly feel will be more than made up to them by the warmer regard in which they will be held by their retail customers. It is safe to say that jobbers expect to gain more than they lose by planting themselves on the side of the retail merchant. With the manufacturer the question is an entirely different one. He may be convinced that in the long run it will be advantageous for him to refuse dealings, especially at extremely low prices, with the catalogue houses, but for the time being his participation in the movement is a step that costs. Severance of relations with catalogue houses would mean a cutting off of valued customers, some of whose orders cover larger quantities of goods than the combined purchases of half a dozen wholesale houses. The manufacturer cannot in reason be expected to fall in line with the same alacrity as do the merchants. To identify himself with the movement would involve consequences perhaps far-reaching, while the wisdom of the step would depend in good part upon the success of the movement, which, in its early stages at least, must be a matter of hope rather than of knowledge.

Some of the manufacturers are prompt to recognize the fact that in the long run the new methods of distribution, in spite of the large quantities of goods which thus find their way to the public, will be detrimental first to the retailer, then to the jobber, and by and by to the manufacturer. To convince the manufacturer that this is the case, that this is the certain and inevitable tendency, must be a prime object with those who are in charge of this campaign. Their aim must be to show the manufacturer where his interests are, not as the result of threats expressed or implied, but in view of the operation of the laws of trade, which will make the new method of distribution ultimately less advantageous to him than that which is now in use. Just in proportion as this conviction is brought home to the manufacturer may his co-operation in opposition to the catalogue houses be expected. Until this is the case it would be unreasonable to ask him to go into the movement with the same spirit as do the jobbers and retailers, who have everything to gain and nothing to lose in the effort. The AMERICAN HARDWARE MANUFACTURERS' ASSOCIATION are therefore doing wisely in making this one of the subjects which will be considered at Atlanta. The matter should not only be presented to them by the jobbers and by the representatives of the NATIONAL RETAIL HARDWARE DEALERS' ASSOCIATION, but it should be considered independently from the manufacturers' point of view. In the meantime it may be assumed that the manufacturers are careful and close observers of all that is going on, and are especially scrutinizing the movement which promises to get under way, so that they may form an intelligent opinion of the sincerity of its promoters, the wisdom of the methods pursued, and the feasibility of accomplishing something for the mitigation of the evils, actual and anticipated.

Meanwhile it must be borne in mind that the problem is a grave one, calling for the best judgment and for united action. If it is approached in a narrow spirit and individuals or associations seek to make capital out of it, it will be to imperil the effort and very likely cause it to come to naught. There is need, first of all, that the matter be approached wisely and on right lines; that the principles which are asserted as applying to the action of the trade be sound and reasonable and capable of practical application. There is need, too, that united effort be made by manufacturers, jobbers and retailers. How to accomplish this will be one of the questions before the gathering at Atlanta, so that not only the association jobbers and retailers, but also the great outside jobbers and the manufacturers, shall be brought together into harmonious co-operation for the general welfare of the trade. The way may not be clear to put the matter into definite and final form at the approaching conventions, but it is certainly to be hoped that nothing will be done to prevent the ultimate coming together of all the elements in the trade who are willing to unite their efforts in view of catalogue house methods.

There is in connection with this matter one point which should be emphasized: While it is eminently proper that those through whom the goods come to the retailer should take counsel together with reference to the disturbance of existing trade conditions, the retail merchants must not rely upon any help that may come to them from such a source. They must recognize the fact that a great many of the evils under which they suffer come from their own lack of enterprise and alertness, and that in combating the evils thus encouraged they are to rely upon their own intelligent efforts, upon their own skill and vigor, in maintaining and strengthening their position in the presence of the new competition. If the efforts of manufacturers and jobbers have a tendency to make the great body of retail merchants wait until the measures to be inaugurated result in something for their benefit, the efforts might as well be abandoned at the outset. Little will be accomplished unless, in connection with what the manufacturers and jobbers attempt, there is a general waking up on the part of merchants throughout the country in meeting this competition in a strong, aggressive, ingenious and business-like way, following the example of the progressive and wide-awake retail houses who have succeeded in holding and even extending their trade under existing conditions.

Condition of Trade.

Trade presents few new features, but is content to move along at a steady but not rapid pace. Manufacturers are finding their facilities sufficient to take care of current business, and in some cases enabling them to put goods in their warehouses, which are in a more comfortable condition than during the active periods, when they knew little of the dignity of being the custodians of any considerable quantities of goods. The convenience of the trade will certainly be served by the ability of manufacturers to make more prompt shipments, a state of things which encourages the purchase of goods in relatively small and frequent lots, instead of in large stock orders, as is the natural course when there is a delay of months in their execution. Both manufacturers and merchants are disposed to pursue a conservative policy in regard to the accumulation of stocks, and there are indications among the manufacturers of a let-up in the pace of production. Prices are, for the most part, without important change and, on the whole, are well maintained so far as open changes are concerned. Foreign business is in general good, and the volume of manufactured products which go abroad is large and growing.

Chicago

(By Telegraph.)

This week's report cannot be quite as favorable as last week's, owing to the fact that the warm weather which gave a temporary impetus to the trade was of only two or three days' duration and the cold north winds which are present all over the West and Northwest have served to chill the ardor of the buying movement. Nevertheless, both jobbers and manufacturers of Hardware feel encouraged over the outlook, particularly as their traveling salesmen represent to them that there is a vast amount of delayed business which will be released the moment warm weather sets in for good, provided this hoped for event is not too long delayed. Lawn Mowers, Steel Garden Tools, Screen Cloth, Screen Doors, Patent Window Screens, Garden Hose and appurtenances, Lawn and Porch Swings and Furniture, Hammocks and kindred lines are moving very well in spite of the cold weather, which fact encourages the interests affected to believe that warm weather will open the flood gates of orders on these goods, which will make the season an excellent one. Builders' Hardware is more active now than it has been for some weeks, and the character of orders received indicates that better conditions are soon to be realized. Strap and T Hinges are being hammered down to ruinous prices owing to the fact that the gentlemen's agreement was not sufficiently binding to resist the onslaught of the buying public in the face of the decreased demand. Wire Nails and Wire are experiencing a seasonable decline in demand as far as the mills are concerned, though jobbers are pleasantly surprised to see an increasing number of small orders for immediate shipment from stock. Prices in general are firm, owing both to a fair demand and to the fact that manufacturers of most lines have effected organizations with sufficient strength to maintain prices against temporary declines.

Louisville.

Belknap Hardware & Mfg. Company.—The market is utterly devoid of exciting or even interesting features. The waiting game is apparently being played by the large people, and as for the country consumer, he is much more interested in getting his corn and tobacco into the ground than in the markets of iron and steel or in railroad finances. The mill man will tell you that he is going to wait until just before the election to buy his scrap, meanwhile he is drawing on his pile. Of course if many are waiting to do this the scrap man will not be slow to understand the situation, and probably a date set like that will fail of its intent and be discounted beforehand.

Of course the figures for steel stock are always interesting. The approach to zero or infinity used to be among the most entertaining of our mathematical problems, and it has not altogether lost its charm. We are taught to know that the assymptote never really reaches the hyperbolic curve, though it gets pretty close to it if you give it time and space. The bond holder is the man, after all. Meanwhile the manufacturers of Hardware seem to be well employed, and, though the season is late, the agricultural prospects are good as far as we can see. Whatever is raised will bring a good price—of that the farmer is sure, and his little country bank is still plethoric with money left over from last year.

A good deal of interest is centered on the meeting of Southern jobbers at Atlanta the last of this month, and something is to be said *ex-cathedra* on certain modern disturbing phases of commercialism. The mere fact that disturbance in the older ways of business is threatened so seriously will serve to revivify the retail trade. We shall see better stores and brighter goods and greater assortments of fetching novelties, that will beat eggs and wash clothes or roast turkeys. Instead of old, dingy show windows, with fly-specked papers of Tacks and Whetstones, we shall see Gilt Bird Cages and Porcelain Refrigerators, and probably a higher standard of clerks to do the selling, so as to persuade the purchaser that home business and personal inspection and helping one's neighbor are a deal better than sending cash to foreign markets for goods "sight unseen," as we used to say in our juvenile trading days. We hope, too, before long to persuade our college graduates out this way that it will pay to spend evening hours by the home lamp reading Shakespeare and the Bible, rather than conning the price of Drawer Pulls by the dozen out of a flimsy list from some distant city. The retail Hardware trade stands for what is progressive and civilizing. We do not believe it will fail to meet the present emergency.

Cleveland.

The W. Bingham Company.—Weather conditions at present are very favorable to the trade, especially for spring goods. Hardware jobbers in this district are all busy filling rush orders for spring goods, as many of the dealers put off buying early on account of the long-drawn-out cold weather. Therefore, some of them, now that the warm weather is on, want the goods quick. Stocks of Shovels, Spades, Rakes, Netting, Wire Cloth, Lawn Mowers, Freezers, Refrigerators, Step Ladders and kindred lines are very good just now, as the jobbers here have kept up their assortments anticipating a quick demand. Now that the lake navigation is open, there will be a large tonnage of Wire and Nails to go forward to Indiana, Michigan and Northwest points, as there were not many orders placed early, the trade putting off buying until their immediate wants required same, and now they are in a hurry for the goods.

Trade in the general line of Hardware is quite satisfactory, viz., Bolts, Locks, Butts, Latches and general line of House Trimmings. There are not many very large orders going forward to any one point, but there is a steady, even demand all around, and orders seem to be well assorted, showing that stocks throughout the country are not large and are pretty evenly depleted. We are looking for a steady, even business right through the spring months. We advise those who have put off ordering spring goods to get busy at once and send their orders in, so that they may receive prompt attention and shipment. There is not an over supply of any of these goods. "First come, first served."

St. Louis.

Norvell-Shapleigh Hardware Company.—Spring continues very backward, and dealers have had a hard time disposing of their first orders for spring goods. What we need is some good, old "perspiry" hot weather. We have had two or three days of it only, and the green things shot up about two inches. In spite of this, the number of orders received is very large, but they are principally sorting-up orders, without much length.

St. Louis has been absorbed in the opening and first two weeks of the wonderful World's Fair. The opening was very propitious—beautiful weather and an enormous crowd. The fair itself is a marvel of beauty and interest, and it is hard to conceive of a person in any condition

of life who would not find something of great interest on the fair grounds. The attendance up to the present time has been greater than at any previous exposition. The crowds are being handled without a complaint and the weather has been delightfully cool. All are invited and all will be welcome.

May and June are the dullest months in the Hardware business. In spite of this, St. Louis is enjoying a very steady, even trade, which is considerably in excess of this time last year, when we were upset by floods, strikes, &c., which happily have been averted so far this year.

Philadelphia.

SUPPLEE HARDWARE COMPANY.—A recent business improvement, owing to more favorable conditions of the weather, is quite apparent in trade circles in our city, and the pleasant weather with higher temperature is much more seasonable. The fair weather, coupled with many days of bright sunshine, has brought both crop planting and the growth of vegetation to a much more normal condition. These conditions have helped the retail trade and naturally have made themselves felt in wholesale circles. How much of the lost trade of both the retail and wholesale merchant can be recovered remains an unsettled problem at this writing. Certain it is, however, that the appearance of the country in this location has every evidence of good crops, healthy vegetation and beauty.

It was the writer's duty, as well as pleasure, during the past week, as a member of the Executive Committee of the National Hardware Association, to visit the home of the association's president, the city of Boston, and after concluding our session there, to accept an invitation from some of the manufacturers of New Britain to visit that city. The interest taken by these meanufacturers in the visiting party, in guiding them through their works and making their visit so pleasant, will always be imbedded in the hearts of these visitors. We found the roads through these sections of New England in splendid condition, and the lawns and foliage beautiful to an extent to make it almost beyond description. It is quite natural for a person to be attached to his own State, and more natural to be attached to and appreciate the city in which he lives, but with the opportunities of quick transit to various States and cities and the more we take advantage of these opportunities, the better are we able to realize that our own States and cities are not the "whole thing."

The outlook for trade the balance of the first six months of the year is quite encouraging. Manufacturers of certain kinds of season goods are still far behind in supplying goods and filling the orders of our merchants even at this late date. Notably is this the case with Screens and Screen Doors and Agricultural Implements, together with very many goods of less immediate importance, and although the season is late the manufacturers of the goods referred to are later still. This is quite early in the season to be short on Wire Cloth and Poultry Netting, nevertheless jobbers with us are suffering from scarcity. The prices on all the above goods are firm, with evidence of advances on some of them if this state of affairs continues.

The catalogue house question, upon which both national wholesale and retail organizations have been working together for over a year past, has now assumed national importance. While this has been the position taken by the writer for years past, perhaps no better illustration can be given of where single barrel guns or half a dozen single barrel guns may fail in results, while concentrated and organized efforts will in the process of time demand the attention of those who have been indifferent to the question.

Portland, Oregon.

CORBETT, FAILING & ROBERTSON.—Portland in April led all Pacific Coast ports in the shipment of wheat and lumber, but there was nothing to brag over when volume is stated as compared with past years. Outlook now is for the biggest crop of wheat ever harvested in Oregon, Washington and Idaho, and it is to be sincerely hoped that prospects will be borne out.

Trade is in the same old job trot that has been the gait since we turned into the new year—no life, snap or vim. Collections? well, the less said the better.

Nashville.

GRAY & DUDLEY HARDWARE COMPANY.—The month of May is about the most quiet month we have in the Hardware trade, and we therefore expect but little business at this time of the year. After the rush of the spring business we do not object to having a quiet month, which enables us to get our stock in good condition preparatory to taking the annual inventory, which is usually taken June 1 or July 1 by most of the houses in this section. While trade is not so good as it was 60 days ago, we are almost as busy as at that time. The farming community are exceedingly busy with their crops, as the late spring has retarded all farm work, and the crops generally are from three weeks to thirty days later than they usually are at this season of the year. Collections are good and the country seems to be in a prosperous condition, and we see no reason why we should not expect a good fall business.

San Francisco.

PACIFIC HARDWARE & STEEL COMPANY.—Business continues to be quite satisfactory, and it is particularly gratifying to notice the increased sales this season of such items as Refrigerators, Freezers, Hammocks, Wire Cloth, Screen Doors and other seasonable goods. There also seems to be a very good demand in heavier goods, such as Pipe and Light Sheets. Other steel products, and particularly Plates, are moving rather slower. Now that the weather has finally settled and we are entering upon our rather prolonged period of no rain, business will assume normal conditions not affected by speculation on the quantity of rain, and we have every reason to expect that this season's business will compare favorably with that of any of its predecessors.

Omaha.

LEE-GLASS-ANDREESEN HARDWARE COMPANY.—No material changes have taken place in trade conditions since our last report. Owing to continuous cold and stormy weather the spring season is three weeks behind the average. General business is, however, very good considering the adverse atmospheric influences. Reports received from different sections of the territory west of this market indicate that copious showers have visited nearly all parts, thus placing the soil in excellent condition for the usual spring preparation. There is a steady demand for all goods that are seasonable, but some of these lines are very scarce, and as the demand is considerably in excess of the supply the jobbing trade are experiencing some difficulty in supplying the requirements of their trade on these special goods with their usual degree of promptness. What is needed now is a change to warmer and more pleasant weather conditions, which never fail to exert a stimulating influence on general business.

NOTES ON PRICES.

Wire Nails.—The market has not recovered from the falling off in demand which has been previously noted by the mills, this condition not being unlooked for after a large spring demand. The mills are busy executing contract orders placed early in the season. The market remains firm in tone. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

Jobbers, carload lots	$1.90
Retailers, carload lots	1.95
Retailers, less than carload lots	2.05

New York.—Local demand is only moderate, but the tone of the market is firm. Quotations are as follows: Single carloads, $2.10; small lots from store, $2.20.

Chicago, by Telegraph.—Mill orders are growing less, as is naturally expected, but the annual slump in demand is not as marked as usual this year, as it has been delayed by the lateness of the season. Jobbers are doing a good business in keg lots from store. Prices are unchanged, as follows: Carload lots to jobbers, $2.10 per

100 pounds; less than carloads to jobbers, $2.15 per 100 pounds; carloads to retailers, $2.15 per 100 pounds; less than carloads to retailers, $2.25 per 100 pounds, all f.o.b. Chicago.

Pittsburgh.—The Wire Nail market is exceedingly quiet, as it always is after spring demand is over, but the mills have enough business on their books to take their entire output for the next month or six weeks. Prices are firm and we quote: Wire Nails, $1.90 in carloads to jobbers, $1.95 in carloads to retailers, and $2 to $2.05 in small lots to retailers, all f.o.b Pittsburgh, 60 days, or 2 per cent. off for cash in 10 days, plus actual rate of freight to point of delivery.

Cut Nails.—There are no indications that any change will be made in prices at the meeting of the Cut Nail Association to be held to-morrow. Prices are well maintained, except to a few points of delivery. Quotations are as follows for Steel and Iron Nails, in all quarters: $1.75, base, carloads, and $1.80 in less than carloads, f.o.b Pittsburgh, plus freight in tube rate book to point of destination; terms 60 days, less 2 per cent. off in 10 days.

New York.—Small lots from store are in light demand. Quotations are as follows: Carloads on dock, $1.89½; less than carloads on dock, $1.97½; small lots from store, $2.05.

Chicago, by Telegraph.—Nothing new has developed in the Cut Nail situation and mill business is seasonably quiet, buyers having well covered their wants for the balance of the spring trade. Prices are unchanged, as follows: Carload lots, both Iron and Steel Nails, Chicago, to jobbers, $1.91½, base; less than carloads, $1.96½. Retailers and large consumers pay 10 cents per 100 pounds above jobbers' prices. Jobbers sell at from $2.10 to $2.30, base, f.o.b. Chicago warehouse, according to customer, size of order, &c.

Pittsburgh.—It is not believed there will be any change in prices of Cut Nails at the meeting of the Cut Nail Association, to be held on May 19. Demand is fair and prices are well sustained, being shaded only in exceptional cases and to a few points of delivery. We quote Steel and Iron Cut Nails at $1.75, base, in carload lots, and $1.80 in less than carloads, f.o.b. mill, terms 60 days, less 2 per cent. off in 10 days.

Barb Wire.—Current demand is light, but specifications on contract orders are being shipped by the mills. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

	Painted.	Galv.
Jobbers, carload lots	$2.20	$2.50
Retailers, carload lots	2.25	2.55
Retailers, less than carload lots	2.35	2.65

Chicago, by Telegraph.—The mills are now well caught up to their orders, except on certain special brands, and jobbers are experiencing an increased demand for small lots to replenish broken stocks. Prices are unchanged as follows: Carload lots, Painted Wire, $2.40; Galvanized, $2.70; to retailers, carload lots, Painted, $2.45; Galvanized, $2.75; to retailers, less than carload lots, Painted, $2.55; Galvanized, $2.85; Staples to jobbers, $2.25 for Plain and $2.65 for Galvanized, with 5 cents advance to retailers.

Pittsburgh.—The volume of new business is light, but the mills are filled up for several months ahead on contracts. Prices remain firm, but without change. Quotations are as follows, f.o.b. Pittsburgh, terms 60 days, or 2 per cent. discount for cash in 10 days:

	Painted.	Galv.
Jobbers, carloads	$2.20	$2.50
Retailers, carloads	2.25	2.55
Less than carloads	2.35	2.65

Smooth Fence Wire.—The demand continues, as is indicated by the new business received by mills, whose books are also well filled by orders previously placed. Quotations are as follows, f.o.b. Pittsburgh, terms, 60 days, or 2 per cent. discount for cash in 10 days:

Jobbers, carloads	$1.80
Retailers, carloads	1.85
Less than carloads	1.95

The above prices are for base numbers, 6 to 9. The other numbers of Plain and Galvanized Wire take the usual advances, as follows:

	6 to 9	10	11	12&12½	13	14	15	16
Annealed	Base.	$0.05	.10	.15	.25	.35	.45	.55
Galvanized	$0.80	.35	.40	.45	.55	.65	1.05	1.15

Chicago, by Telegraph.—A good demand exists for Wire of all ganges, but it is no longer so great that mills cannot give fairly prompt shipment. Prices remain as follows: Smooth Fence Wire, sizes 6 to 9, $2 per 100 pounds in carload lots to jobbers, f.o.b. Chicago; $2.05 per 100 pounds to retailers in carload lots and $2.10 in less than car lots.

Pittsburgh.—Demand is quite good considering the lateness of the season, and the mills are well filled up with tonnage to July 1 or later. Prices are very firm, there being no reasons for making concessions on account of the mills having so much tonnage on their books. We quote as follows, f.o.b. Pittsburgh, terms 60 days, or 2 per cent. discount for cash in 10 days; Plain Wire, $1.80, base, for Nos. 6 to 9, in carloads to jobbers, and $1.95 to $2 in small lots to retailers; Galvanized, 30 cents extra for Nos. 6 to 14.

Cordage.—The Rope market continues in about the condition it has been for the past two or three weeks. Demand is not as active as most manufacturers desire, although quite a volume of business is being done. Quotations on the basis of 7-16 inch diameter and larger are as follows: Pure Manila, 12 cents per pound, with a rebate of ¼ to ½ cent per pound to largest buyers; other grades of Manila, 9 to 11 cents, according to quality; pure Sisal, 9¼ cents, with ¼ cent rebate to largest buyers; mixed Sisal, 8 cents per pound, with no rebate.

Binder Twine.—For the month of May new business is exceptionally light, owing to the large proportion of probable requirements which were covered before prices were announced, and because the possibility of a short demand is causing a portion of the trade to defer purchasing until nearer harvest. Prices are reported well maintained, as announced by the International Harvester Company, as follows:

	Cents per lb.
Sisal	10¼
Standard	10¼
Standard Manila (550 feet)	11¼
Manila (600 feet)	12¼
Pure Manila (650 feet)	13¼

Five-ton lots ⅛ cent less; carload lots, ¼ cent less. Kansas City, Minneapolis, Omaha, Council Bluffs, ¼ cent higher. Pacific Coast points, 1 cent higher. Eastern prices are, as a rule, ¼ cent less.

Glass.—At the meeting of the National Association of Window Glass Manufacturers, held at Cleveland, Ohio, on May 12, 1427 pots were represented, being a gain of 302 pots, which had joined the organization since the meeting held at Cincinnati on April 15. The necessary number to make the organization effective is 1800, and it is reported that enough more factories have signified their intention to join to bring the number up to the required figure within the next 30 days. It is understood that a joint meeting was held by the jobbers and manufacturers at which the jobbers pledged themselves to try to reorganize the National Window Glass Jobbers' Association, provided the manufacturers succeeded in getting 90 per cent. of the factories to sign a selling agency agreement. The meeting adjourned to reconvene at Niagara Falls on June 14.

Oils.—*Linseed Oil.*—The continued absence of new business has caused a feeling of weakness, although State and Western is the only one in which there is any quotable change in price. Demand is light and confined almost exclusively to small lots. Quotations are as follows: City Raw, in lots of five barrels or more, 42 cents per gallon; in lots of less than five barrels, 43 cents per gallon; State and Western Raw, 38 cents per gallon. Boiled Oil, the usual 2 cents advance per gallon over Raw.

Spirits Turpentine.—The market has fallen of ½ cent from last week's quotations, owing to light demand and more liberal receipts of new crop in the Southern market. Quotations, according to quantity, in this city are as follows: Oil barrels, 57½ to 58 cents; machine made barrels, 58 to 58½ cents.

Brass Cocks.—The action of the manufacturers of the Hardware line of Brass Cocks in adopting the uniform list under date March 7 meets with general approval from the trade. In this way a good deal of uncertainty and perplexity has been removed in connection with prices on this line. As giving the list now in force in a concise and convenient form, the following arrangement of it will be of interest to the trade. It is subject in a general way to a discount of from 70 and 10 to 75 per cent.:

LEVER AND HANDLE BIBS.

Inch	¼	⅜	½	⅝	¾	1	1¼	1½
Plain Bibs, Lead Pipe:								
Rough	$12.00	14.00	16.00	19.00	26.00	37.00	60.00	90.00
Finished	13.50	15.50	18.00	21.50	29.00	41.00	70.00	110.00
Nickel plated	15.00	17.00	20.00	24.00	32.00	45.00	80.00	130.00
*Plain Bibs, Screwed for Wood:**								
Rough	$13.00	15.00	18.00	22.00	30.00	43.00	68.00	100.00
Finished	14.50	16.50	20.00	24.50	33.00	47.00	78.00	120.00
Nickel plated	16.00	18.00	22.00	27.00	36.00	51.00	88.00	140.00
Plain Bibs, S. O. T.:								
Rough	$13.00	15.00	18.00	22.00	30.00	43.00	68.00	....
Finished	14.50	16.50	20.00	24.50	33.00	47.00	78.00	....
Nickel plated	16.00	18.00	22.00	27.00	36.00	51.00	88.00	....
Hose Bibs, S. O. T.:								
Rough	$17.00	20.00	24.00	33.00	48.00	74.00	....	
Finished	18.50	22.00	26.50	36.00	52.00	84.00	....	
Nickel plated	20.00	24.00	29.00	39.00	56.00	94.00	....	
Plain Bibs, Iron Pipe:								
Rough	$12.00	14.00	16.00	19.00	26.00	37.00	60.00	90.00
Finished	13.50	15.50	18.00	21.50	29.00	41.00	70.00	110.00
Nickel plated	15.00	17.00	20.00	24.00	32.00	45.00	80.00	130.00
Hose Bibs, Iron Pipe:								
Rough	$16.00	18.00	21.00	29.00	42.00	66.00	98.00	
Finished	17.50	20.00	23.50	32.00	46.00	76.00	118.00	
Nickel plated	19.00	22.00	26.00	35.00	50.00	86.00	138.00	
Note: For Ball Lever Handle, add	3.00	3.00	3.00	4.00	5.00	6.00	7.00	

* Some makers use different list.

LIQUOR COCKS.

Inch	¼	⅜	½	⅝	¾	1
Tee or Lever Handle:						
To drive	$13.00	15.00	18.00	23.00	32.00	45.00
To screw	13.50	15.50	19.00	24.50	34.00	48.00

IRON PETROLEUM COCKS.

Inch	⅜	½	⅝	¾	1
Tee or Lever Handle, Nut and Washer:					
Tinned shank	$10.00	11.00	13.00	16.00	23.00
To screw	10.00	11.00	13.00	16.00	23.00

COMPRESSION LOCK COCKS.

Inch	⅜	½	⅝	¾	1
Compression Lock:					
To drive	$15.00	18.00	23.00	32.00	45.00
To screw	15.50	19.00	24.50	34.00	48.00
Note: For Lever Handle add to above list, $1.					
Andrew's Compression:					
To drive	....	$24.00	29.00	....	....
To screw	....	25.00	30.50	....	....

GLOBE COCKS.

Inch	¼	⅜	½	⅝	¾	1
Tee Handle:						
Tinned shank	$15.00	18.00	22.00	27.00	36.00	49.00
To screw	15.50	18.50	23.00	28.50	38.00	52.00
Lever Handle:						
Tinned shank	$15.50	18.50	23.00	28.00	37.00	51.00
To screw	16.00	19.00	24.00	29.50	39.00	54.00

BRASS KEROSENE OIL COCKS, LEVER HANDLE.

Inch	⅜	½	⅝	¾	1
Nut and Washer:					
Tinned shank, rough	$10.50	13.00	17.50	26.00	38.00
Tinned shank, dipped finish	12.00	15.00	20.00	29.00	42.00
To screw, rough	11.00	14.00	19.00	28.00	41.00
To screw, dipped finish	12.50	16.00	21.50	31.00	45.00

BOTTLING COCKS.

Inch	¼	⅜	½	⅝	¾	1
To drive, rivet bottom	$11.00	12.00	17.00	21.00	30.00	44.00
To screw, rivet bottom	11.50	12.50	18.00	22.50	32.00	47.00
To drive, nut and washer	13.00	14.00	19.00	23.00	32.00	46.00
To screw, nut and washer	13.50	14.50	20.00	24.50	34.00	49.00
Screw nozzle, to drive, nut and washer	....	....	28.00	34.00	44.00	....
Screw nozzle, to screw, nut and washer	....	....	29.00	35.50	46.00	....

RACKING COCKS.

Inch	¼	5/16	⅜	7/16	½	9/16	⅝	¾	⅞	1	1¼	1½	2
Rivet Bottom:													
To drive	$8.00	9.00	10.00	12.00	13.00	15.00	18.00	27.00	33.00	40.00	....	....	....
To screw	8.50	9.50	10.50	13.00	14.00	16.50	19.50	29.00	35.00	43.00	....	....	....
Nut and Washer:													
To drive	$10.00	....	12.00	....	15.00	....	20 00	29.00	....	42.00	....	....	....
To screw	10.50	....	12.50	....	16.00	....	21.50	31.00	....	45.00	....	....	....
Loop Handle:													
To drive	....	....	....	....	....	....	....	....	....	$46.00	95.00	157.00	260.00
To screw	....	....	....	....	....	....	....	....	....	49.00	100.00	164.00	270.00
Loose, Iron Handle:													
To drive	....	....	....	....	$16.00	....	21.00	30.00	....	43.00	90.00	150.00	250.00
To screw	....	....	....	....	17.00	....	22.50	32.00	....	46.00	95.00	157.00	260.00

LOCK COCKS.

Inch	¼	5/16	⅜	7/16	½	9/16	⅝	¾	⅞	1			
Rivet Bottoms:													
To drive	$10.00	11.00	12.00	14.00	15.00	17.00	20.00	29.00	35.00	42.00	....	....	....
To screw	10.50	11.50	12.50	15.00	16.00	18.50	21.50	31.00	37.00	45.00	....	....	....
Nut and Washer:													
To drive	$12.00	....	14.00	....	17.00	....	22.00	31.00	....	44.00	....	....	....
To screw	12.50	....	14.50	....	18.00	....	23.50	33.00	....	47.00	....	....	....

COMPRESSION BIBS.

Inch	¼	⅜	½	⅝	¾	1	1¼	1½	2
Plain Bibs, Iron Pipe:									
Finished	$11.00	12.00	13.00	16.00	20.00	40.00	65.00	100.00	200.00
Nickel plated	13.00	14.00	15.50	18.50	22.50	43.00	69.00	108.00	212.00
Hose Bibs, Iron Pipe:									
Finished	....	....	$15.00	18.00	22.00	43.00	69.00	106.00	210.00
Nickel plated	....	....	$15.00	20.50	24.50	46.00	73.00	114.00	222.00
For Stuffing Box, add, per doz	....	....	3.00	3.00	4.00	6.00	12.00	15.00	25.00
Bibs, S. O. T.:									
Rough	$11.50	12.50	14.50	18.00	23.00	42.00	....	....	....
Finished	12.00	13.00	15.00	19.00	24.00	46.00	....	....	....
Nickel plated	14.00	15.00	17.50	21.50	26.50	49.00	....	....	....
Hose Bibs, S. O. T.:									
Rough	....	....	$16.50	20.00	25.00	45.00	....	....	....
Finished	....	....	17.00	21.00	26.00	49.00	....	....	....
Nickel plated	....	....	19.50	23.50	28.50	52.00	....	....	....

A SEMICENTENNIAL CELEBRATION.

THE fiftieth anniversary of the founding of the Packard Hardware Company, Greenville, Pa., was celebrated by a dinner tendered the employees and a number of guests at the Hotel Speir on the 9th inst. About 50 people participated in the banquet. John R. Packard, joint founder of the house with the late Dr. Packard, acted as toastmaster. The menu card was a tasteful one and on its cover carried illustrations of Strap Hinges and an Anvil, the old trademark of the house. A number of very interesting addresses were made, and their eloquence and humor contributed much to making the occasion one that will live long in the memories of those permitted to be present. This well and favorably known house was incorporated in 1892, J. R. Packard being president; G. B. Chase, treasurer, and John B. Chase, secretary. The capital stock is $125,000.

MARSHALL TIDD, inventor of firearms and leather machinery, died at his home in Woburn, Mass., Wednesday, May 11, aged 84 years. Mr. Tidd was born in Woburn January 14, 1820, and learned the trade of shoemaker. Proving to have a taste for mechanics, he made important improvements in the leather working machiney then in use. In his early life he became interested in firearms, and his ideas and their development made him well known. He made large numbers of freak weapons, such as gun canes and jackknife rifles. Many years ago he fashioned a pistol from a piece of iron rail, and it attracted much attention as a novelty. During the Civil War he invented a telescopic attachment for military rifles which met with considerable favor.

The Atlanta Conventions.

THE formal programmes for the conventions next week, May 24-27, at Atlanta, have been issued, and an inspection of them indicates that the large and representative gathering of the trade, merchants and manufacturers who will be in attendance will be called upon to discuss unusually important and interesting questions as well as to participate in an attractive series of entertainments.

For the sessions of the manufacturers, which will be held at The Piedmont, no regular papers are announced, the subjects to be considered coming up in the way of reports of committees. Every member, however, will be given an opportunity of speaking on any question before the meeting, each speaker being limited to a five-minute address. Under the order of "New Business," any member may suggest or present a question for immediate or future discussion. The members of the American Hardware Manufacturers' Association will attend the opening session of the Jobbers' Association on Tuesday morning, and in the afternoon their executive committee will hold a special meeting. The formal opening of their convention will take place on Wednesday morning, with an executive session open to members only.

The convention of the Southern Hardware Jobbers' Association will be inaugurated on Tuesday morning at 9.30 o'clock, the scene of the deliberations being the ballroom of the Kimball House, the headquarters of the jobbers. As noted above, the manufacturers and other visitors will be present at this session. Another joint session of the two associations will be held on Wednesday afternoon.

During the two conventions the following live subjects will be discussed in specially prepared papers or otherwise:

The Southern Association—What Shall Be Done to Nurture It?

The Hardware Jobber—His Worst Enemy.

What the Southern Association Has Done for Its Membership, and What Is Yet to Be Accomplished.

Catalogue House Competition.

The Necessity of a Closer Affiliation of Jobber and Retailer.

Rebates and Restrictive Prices from Manufacturers of Association Goods vs. Open Market.

Should Not Manufacturers Protect the Jobbers Against Radical Declines Brought About by Disagreements in Their Own Associations?

The Injustice of Associated Manufacturers Withholding Premiums from Jobbers on Account of the Purchase of Goods of Other Than Their Manufacture.

Increased Expense Account and How to Reduce It.

Employees' Mutual Benefit Associations.

Suggestions to the Buyer from the Traveling Man.

Of the above topics, Catalogue House Competition will doubtless receive the largest share of attention, as preparations have been made for a thorough discussion of it both by the jobbers and manufacturers, a number of prominent representatives of both classes of trade having, it is understood, been invited to make more or less formal addresses. The delegation representing the National Retail Hardware Dealers' Association will also take a conspicuous part in the consideration of this absorbing question.

The social features comprise a theater party on Tuesday evening, a smoker on Wednesday evening, a banquet on Thursday evening, and a trolley ride and barbecue on Friday afternoon.

DUNHAM, CARRIGAN & HAYDEN COMPANY.

ON and after May 20, Dunham, Carrigan & Hayden Company of San Francisco will handle their general buying, as well as the payment of their accounts from San Francisco, instead of through their New York office, as heretofore. C. W. Gause, their managing buyer, will therefore be transfered to San Francisco; but his many friends in the trade, who have come to value him highly during his residence here and will sincerely regret his departure, will anticipate the pleasure of seeing him in the frequent visits which, it is expected, he will make in connection with his relations to the Eastern market. The company's New York office will still be under the management of William L. Carrigan for emergency and special business.

Letters from the Trade.

Our readers are invited to discuss in these columns questions of trade interest connected with the manufacture or sale of Hardware. We shall be pleased to have a free expression of opinion on subjects deserving the attention of Hardware merchants and manufacturers.

The Growing Scarcity of Timber.

FROM A MANUFACTURER OF WHEELBARROWS: We read the letter in *The Iron Age*, 5th inst., regarding the growing scarcity of wood material for all kinds of Handles. The same thing applies to many other lines of wood goods. It covers the wood Wheelbarrow business, and the trade must prepare themselves for Steel Barrows very soon. Wood material for Barrow making is nearly exhausted, and what little is left has trebled in value in the past 18 months.

Packing Sad Irons.

FROM A MERCHANT IN IOWA: The asbestos Sad Irons are now packed in a neat wood box, and it is certainly the proper thing. If the makers of all patent Sad Irons could be induced to put these irons up in sets and pack them in a wood box or a substantial paper box they would confer a favor on retail dealers generally. I believe the average dealer would pay a little extra for the staple selling Sad Irons to have them packed in sets. Please call the attention of the manufacturers to this scheme.

REQUESTS FOR CATALOGUES, &c.

The trade are given an opportunity in this column to request from manufacturers price-lists, catalogues, quotations, &c., relating to general lines of goods.

REQUESTS *for catalogues, price-lists, quotations, &c., have been received from the following houses:*

FROM THE LOCKESBURG HARDWARE COMPANY, Lockesburg, Ark., who have been incorporated with a capital stock of $12,000, $6000 paid in, and have just opened up in the Shelf and Heavy Hardware, Tinware, Implement, Vehicle and Sporting Goods business.

FROM THOMAS H. CARLIN, Monticello, Mo., who has recently bought out the Hardware, Stove and Sporting Goods business formerly conducted by R. H. Barnett.

FROM BUFFALO HARDWARE & IMPLEMENT COMPANY, Buffalo, Ky., who have lately been incorporated with $5000 capital, to carry on the Shelf and Heavy Hardware, Stove, Implement and Vehicle business.

FROM PHILIP FORSBERG, Sioux City, Iowa, who has recently commenced business as a dealer in Hardware, Stoves, Paints, Sporting Goods, &c.

FROM H. S. CHAMBERLAIN, Winona, Minn., who has bought W. L. Altenburg's Hardware business at Wells, and removed it to Winona.

FROM SMITH & LAWRENCE, Lowell, Mass., who have lately embarked in the retail Hardware, Implement, Paint and Sporting Goods business.

FROM EVERTS HARDWARE COMPANY, Auburn, N. Y., comprising Geo. W. Everts and Chas. J. Everts, formerly of Everts Bros. & Pomeroy, who have opened up in the General Hardware, Paint, Stove, Furnace and Sash, Door and Blind business.

FROM B. M. & S. HARDWARE COMPANY, Phillipsburg, Kan. R. Frank Stinson is now sole proprietor of this business, having purchased the interest of his two former partners, the store being conducted under the same style as heretofore.

THE CATALOGUE HOUSE QUESTION.

LETTERS FROM HARDWARE MERCHANTS ON CATALOGUE HOUSE COMPETITION.

FROM MERCHANTS IN PENNSYLVANIA: The only way for the retailer to get around the catalogue houses is to convince the jobber and manufacturer that the retailer should be the proper dispenser of his manufactured article, and that the combined retail trade is worth more to him than the catalogue house. You know that a prominent jobber was the go-between on a large lot of Single Guns this spring, and the other Gun makers are now making a price on Guns that will enable the retailer to sell his Guns at good profit and compete with Chicago catalogue houses.

FROM MERCHANTS IN IOWA: We are very much interested and appreciate your effort along the lines of the catalogue house question. We do not believe that the catalogue house can ever be denied its volume of trade, but we do believe that with the jobber more loyal to the retailer, and the retailer more loyal to his trade, the question would solve itself. The catalogue house has wisely pitted its greatest strength on our weakest point, and the retailers organized as a unit is the only way that we can counteract. We think the retailers are, to some extent, to blame, and if we taught more by example it would be better for all concerned.

FROM MERCHANTS IN MICHIGAN: It will be necessary for many of the retail dealers to become jobbers to a certain extent, in order to meet some of the competition that the catalogue houses are developing. We are all confronted with a situation that calls for prompt action. Time will show, of course, whether the jobber and retailer must one or both give up their fields for the catalogue houses, which depend largely on the course pursued by the manufacturers in selling the catalogue houses direct at as low a price if not lower than they can the jobbers.

THE CATALOGUE HOUSE AND RETAIL ENTERPRISE.

FROM A PROMINENT MANUFACTURER: In the discussion of the catalogue house, *i. e.*, selling direct to consumers by catalogue, two facts should be kept in mind.

FIRST—That the so-called catalogue house is with us to stay; cannot be driven or legislated out of business.

SECOND—The catalogue house will illustrate standard, well-known goods, and if the factories do not sell them direct and control their prices the catalogue house will offer the goods at low prices, sometimes less than they pay for same.

Suggestions to Retailers.

Furthermore, as the retailer and catalogue house solicit the same trade, the consumer, it is a contest between the two, and the retailer can never gain much headway by insisting on others fighting his battles for him; he must fight them himself, and in doing so he can be assured of the support of the jobber and manufacturer, but much "missionary work" will have to be done among the retailers, and many will have to change their present methods of doing business—care of their stock, appearance of their store, advertising, long-time credits and, in some instances, "old time" profits.

Retail dealers too often forget that the catalogue houses sell goods for "cash only" and try to compete without adding express or freight, and give their customers six months, or possibly a year's time, without interest, and any dealer doing a large credit business must add to the general cost of transacting business a considerable per cent. for loss on account of "bad debts," besides the tying-up of a large amount of capital.

The retail Hardware dealer, as a rule, will price an article costing 35 to 40 cents a dozen at 10 cents each; the department stores and catalogue houses would sell the same article at 6 or 7 cents each, and articles costing the Hardware dealer 75 to 80 cents per dozen are expected to bring 15 cents each, and $1.50 goods are marked 25 cents each, and often more.

When the consumer can save on staple goods, can you blame him for buying of the department stores or sending to the catalogue house?

The "New England Manufacturer's" article, which appeared on page 47 of *The Iron Age* under date of May 12, is worthy of the careful consideration of every retail dealer.

The retailers must all wake up to the fact that "it is up to them" to act, and that they can depend on the jobbers and manufacturers to co-operate fully. But many, yes, very many, among their own ranks need lecturing—some, we might say, even have the "riot act" read to them—and with this vast army of the most intelligent class of retailers in the world working in unison an adjustment of the present difficulties could soon be accomplished to the satisfaction of all.

SUGGESTIVE QUESTIONS FROM A MANUFACTURER.

To the Editor: The discussions that appear from time to time in your paper undoubtedly promote the good understanding of the various elements of the Hardware trade.

In regard to catalogue houses, is it any more proper for a manufacturer to boycott them than it is for a labor union to institute a boycott against "what not"?

If Messrs. Simmons, Bartlett, Bindley and other jobbers refuse to buy what good judgment should show and events prove to be salable goods, shall the joy of such refusal stay the manufacturer's hunger and thirst and clothe his children; and can it be negotiated for a cemetery lot?

Cases come up where the retailer, or associations of them, refuse to buy such and such lines from jobbers—what then?

Here is a question to thresh out in honor and sincerity, having in mind that transitions are eventually invariably for the best.

Should a jobber have extreme or jobbers' prices simply because he styles himself a jobber, and regardless of what quantity he buys? If so, is it not fair to assume that many claim themselves jobbers who are not?

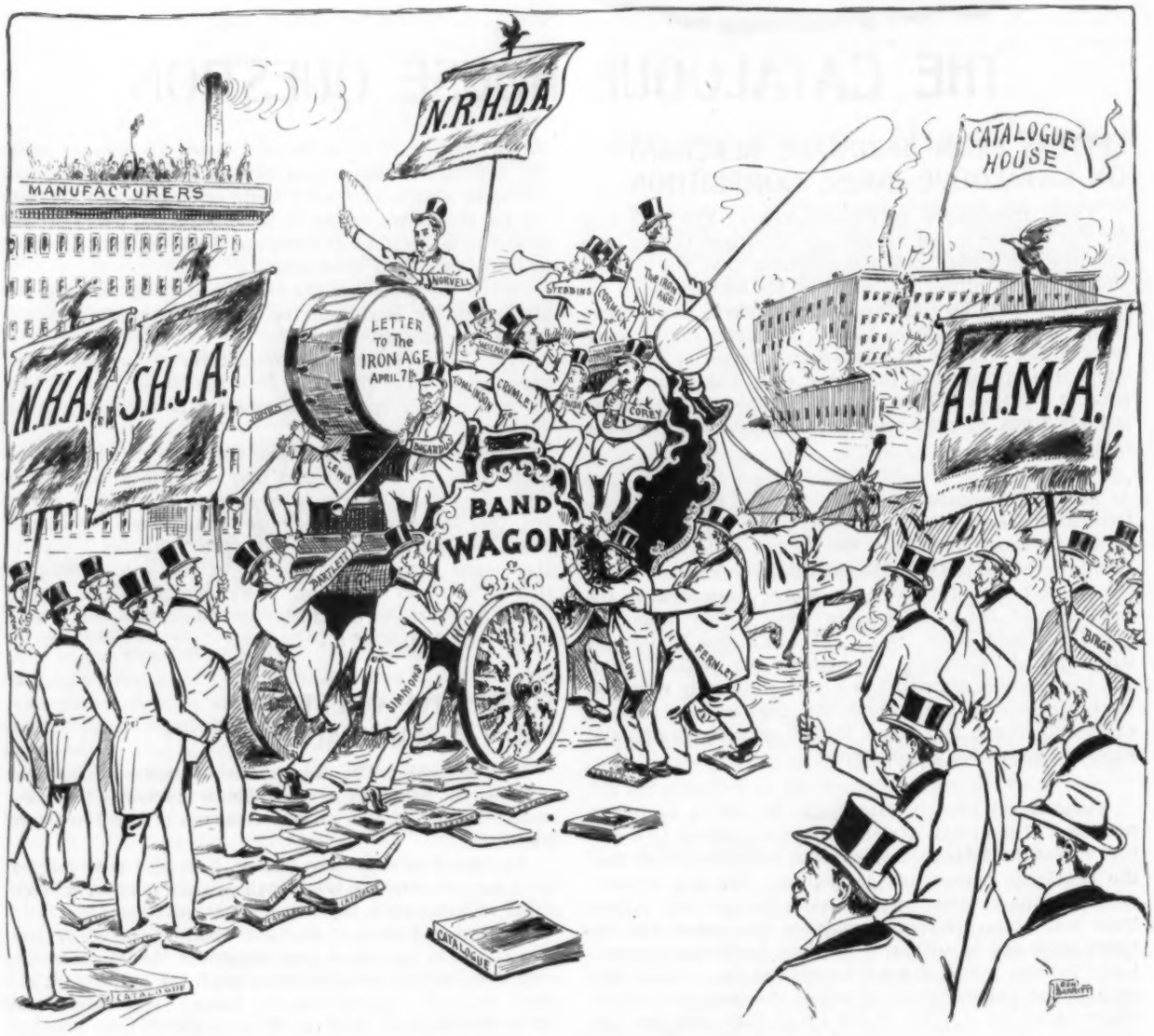
Should the jobber retail, and, if so, should he buy as a jobber for his jobbing department, and as a retailer for his retail department?

With prices, is not the best way, the most honorable way and the longest lived way to make a reasonable quantity and less than quantity price. Deceive no one. If the quantity is bought, let it carry the quantity price, and if it is not bought, let it not?

When the question is asked, "Is this your best price," how many times is the truth told? Some hold that it is never necessary to tell a lie. CHAMFERED.

CATALOGUE HOUSES—THEIR COMPETITION.

IN a previous article the writer insisted on the rights of these people to do business being recognized under any circumstances, and in the light of any effort or combination of efforts in a manner to control or curtail their methods. I note in your issue of *The Iron Age*, under date of the 12th, an editorial along the same lines, elaborated and much more to the point—an article that should be thoroughly read and taken to heart by all interested in the subject before any serious discussion or action is taken by the associations who are now about to



THE HARDWARE TRADE AND THE CATALOGUE HOUSE.

consider the matter. It in no way lessens the urgency of the movement, but in its counsel as to the danger of approaching the subject with denunciation and along wrong lines is worthy of the most serious and careful consideration. There are catalogue houses and catalogue houses, but the "pangs we suffer" from are confined to but very few, and those chiefly in one city. It is the methods of these few houses that are now so wofully crippling the retail Hardware merchant, and through the retailer the jobbing interests of the entire country. The means for the correction of these methods had better by far be years in coming than that rashness and overzealousness undo all the good that has been and will be attempted. It's very much like a long seated disease, in most cases requiring the months and years of treatment that were required to give birth to the affliction. These men have all started from small beginnings, have had a rapid but gradual growth, have invested literally millions in their plants—and are in business to stay. All efforts, all associations and combinations cannot put them out. They can only correct their methods and turn them into proper channels of trade. Perhaps no one realizes so well as the catalogue man himself how baneful is his competition, how mischievous as compared with what are called legitimate trade methods; and yet his own are not illegitimate, no matter how badly they hurt or who they cripple. So long as they are not, he will make every known effort to continue along the same lines, and it will devolve as largely on the individual as the association, on the retailer as the jobber, and on the jobber individually as the manufacturer, that each in his way make toward the correction of such methods as best he may.

A Danger to Be Avoided

Rashness and Overzealousness

Methods Not Illegitimate

In the discussions offered through your pages many clever suggestions have been made, among the best, perhaps, that every retailer "meet any price offered when proper specifications and brands are named and maintained," with expense of delivery added and cash for the goods laid down. It's a fair proposition, and the only one that is fair, and made use of universally in connection with the efforts of jobber and maker, would in time come as near keeping the farmer and city buyer at home as any other one method.

Meet the Price

As to prices made by these people, this is a time and the case is at hand where comparisons are not odious. Did you ever go through one or both of the larger catalogues, carefully noting the prices named? It is not so hard in very many cases to meet prices; in fact, we more often unconsciously do it than we know, but the fact that the prices on small and leading articles are always quoted us has led to the error of believing that all goods are so quoted. The things we see and use and sell every day and all the time are the ones that are slaughtered. The goods that have a brand or a well-known trade number that you buy in every store are the things that are sold without profit, in the hope that other goods with profit will be added to the order.

Only Leading Articles Slaughtered

An experience here will be readable, perhaps profitable. Two customers had specified two partial sets of

tools, the sum total of each being under $20 for the lot, special brands of Saws, Planes, Draw Knives, &c., being wanted and asked for, and all selected from one of the big books of the catalogue house. The offer was made to meet prices as nearly as possible and to furnish specified brands, or to furnish one set at the price, the other one to come from the catalogue house subject to examination, and to be accepted if all right. The latter proposition was accepted, and in the end the second set was returned and our own taken, for the reason that with but one exception not one tool came to hand showing the brand selected. While they were fairly good tools they were not what were wanted, and in the end our goods were sold at our price. It is this sort of competition we are up against very many times, but in most cases the money has gone forward, and the expense and trouble of reclaiming it are not gone into.

Throwing Down the Gauntlet

A Comparison of Prices

As a matter of comparison and showing how easy it may be to meet these prices in many instances, the writer submits the following as familiar and selected at random:

	Catalogue prices.	*Ordinary retail prices.*
¾-in. Harness Snaps	*15c.*	*20c. dozen.*
1-in. Harness Snaps	*24c.*	*30c. dozen.*
Hand Clippers	*$1.00*	*$1.00 pair.*
Horse Clippers	*$1.00, $1.50*	*$1.00 @ $1.50 pair.*
Curry Combs	*10c., 15c.*	*10 @ 15c.*
Trace Chains, 7-10-2	*42c.*	*50c. pair.*
Chicago Geared Clippers	*$7.85*	*$8.00 set.*
Triple pl. Knives and Forks	*$2.60*	*$2.75 set of 6.*
1847 Knives and Forks	*$3.15*	*$3.25 @ $3.50 set of 6.*
1847 T Spoons	*$3.30*	*$3.50 dozen.*
McClellan Saddles	*$5.50*	*$5.50 @ $6.00.*
Rubber Mouth Bitts	*27c.*	*35c.*
National White Lead	*6¾c.*	*6¾c.*
Cheaper Leads	*4 and 5c.*	*4½ @ 5c.*
Varnish Stains	*17c.*	*20c.*
Paint Brushes	*10, 13, 19c.*	*10, 15 @ 25c.*
3-Knot Brushes	*94c.*	*$1.00*
French Files	*35c.*	*35c.*
Manicure Scissors	*45c.*	*50c.*
Manicure Nippers	*$1.25*	*$1.35*
Newark Stove	*$14.00*	*$14.00 @ $15.00*
Oil Heaters	*$2.75 @ $4.50*	*$2.75 @ $5.00*
1878 Knives and Forks	*35c.*	*40c. set of 6 each.*
Razors	*50c. @ $2.00*	*50c. @ $2.00*
Metal Gimlets	*2c.*	*5c.*
Tack Claws	*10, 12c.*	*10, 15 @ 20c.*
Star Safety Razors	*$1.45*	*$1.50*
Above in case	*$2.00*	*$2.25*
Razor Strops	*19 @ 75c.*	*25 to 75c.*
Sewing Machines	*$10.00*	*$12.00*
Iron Smooth Plane	*$1.64*	*$1.75*
D8 Hand Saws	*$1.38*	*$1.50*
4-ft. Poultry Netting	*$2.60*	*$2.85 roll 150 feet.*
S. & W. Revolvers	*$10.50 @ $12.00*	*$10.50 @ $12.00*
I. J. Revolvers	*$4.00*	*$4.25 @ $4.50*
Rotary Washers	*$5.45*	*$6.00*
Clothes Wringers	*$1.37, $1.95, $3.15*	*$1.50, $2.00, $3.00*
8-qt. Stuffers	*$5.25*	*$5.25 @ $5.50*
Wright Anvils	*12c.*	*11½ @ 12c.*
C. E. Tenny's Hand Saws	*$1.54 @ $1.90*	*$1.50 @ $1.75*
Steel Figures, in sets	*60c*	*65c.*

And so on through the entire list. In many, many cases the prices are easy and profitable ones to meet if we but always had the catalogues on our desks and could verify them.

In the cases noted above the writer has looked up numbers, sizes, &c., that the comparison may be a fair one. There are many small articles like Metal Gimlets, Brad Awls, &c., that are quoted at a nominal nothing, and it is these leaders that bring the balance of the order. You will note that standard goods which they cannot buy lower than can the average merchant are quoted no lower than he ordinarily sells them, and there are cases in which the catalogue prices are even higher. The whole scheme is based on a multiplicity of small articles and branded staples as leaders—the staples only where they can be used to great advantage. These same small articles are now being made leaders of by all variety and department stores and the 5 and 10 cent stores. There are makes of Hand Saws, Anvils, Clippers, Guns and what not that are quoted at even higher prices than the average merchant is able to get. There are other branded goods that are sold for cost and less.

The Catalogue Scheme

You will also find the numbers of certain Planes and Levels purposely changed, and schemes of all kinds are resorted to that the buyers may be convinced they are purchasing of the cheapest houses in America. The writer believes, however, that it is possible in the ordinary run of their Hardware lines to select at least 50 lines of goods that as a legitimate offer are from 5 to 15 per cent. higher than the goods are ordinarily sold in our stores, and it is these things we want to keep before us and convince our customers of.

Tricks and Bluffs

Now, more than ever before, is the time to have on our counter or our desk copies of every one of these catalogues with which we come in conflict. They can be had for the asking at any time and by any one. It's a good point, too, not simply to get them, but study them; go through them as carefully as if buying goods. You'll know then just what you are talking about when trying to convince a customer that you are right and he must be wrong. The simple fact that you are posted will go a great, long way with the customer. H. C. W.

Get a Catalogue

PRICE-LISTS, CIRCULARS, &c.

Manufacturers in Hardware and related lines are requested to send us duplicate copies of catalogues, price-lists, &c., one copy for our Catalogue Department in New York and another for our London Office; and at the same time to call our attention to any new goods or additions to their line, of which appropriate mention will be made, besides the brief reference to the catalogue or price-list in this column.

THE W. S. TYLER COMPANY, Cleveland, Ohio: Double Crimped Wire Cloth and Screen made from brass, copper-bronze, iron and steel wire; Ornamental Iron Work, &c. The company have issued a price-list which applies to their general catalogue No. 21.

THE BRYAN MFG. COMPANY, Bryan, Ohio: Champion Wheel Barrows, illustrated in various styles.

KEUFFEL & ESSER COMPANY, 127 Fulton street, New York: Circular relating to the company's various brands of Drawing Paper, in continuous rolls and sheets.

KELLY FOUNDRY & MACHINE COMPANY, Goshen, Ind.: Catalogues relating to Steel Tanks, Ash and Garbage Cans, Tank Heaters, Boiler Fronts and Castings, &c.

WILLIAM G. LE COUNT, South Norwalk, Conn.: Supplement to price-list illustrating Extra Heavy, Two Screw, Straight, Bent and Double Tail Dogs.

UNION BRICK BOND COMPANY, Pittsburgh, Pa.: Folder relating to Metallic Bonds for bonding hollow walls, brick veneering, &c.; also the Brick Handler, for loading and unloading brick.

DIAMOND SAW & STAMPING WORKS, Buffalo, N. Y.: Sterling Hack Saws and Frames, ranging in size from those for ordinary work to those made especially for railroad and structural iron work.

PACIFIC STEEL & WIRE COMPANY, San Francisco, Cal.: Catalogues relating to the Lamb Cableway, Wire Rope, Farm, Lawn and Poultry Fences, &c.

WEED & Co., Buffalo, N. Y.: A number of inserts for pasting in their large catalogue.

THE third annual meeting of the National Cycle Trade Association will be held in New York City on June 22. Proper committees are being appointed, and a very pleasant and successful gathering is anticipated.

BULLARD & GORMLEY, Chicago, have rented two floors adjoining their present store, giving them about 10,000 square feet additional floor space, which will be used for carrying larger stocks of seasonable Hardware lines.

WILLIAM MURRAY of the Murray-Brooks Hardware Company, Lake Charles, La., died at Hot Springs, Ark., on Sunday, 1st inst.

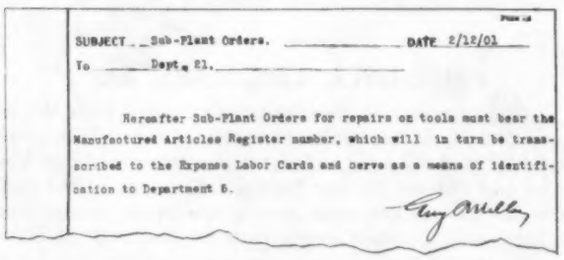
FACTORY COST AND BUSINESS METHODS.

We are indebted for the following article to Guy P. Miller, assistant secretary of the Bridgeport Brass Company, Bridgeport, Conn., whose system of Factory Costs we have recently described.

DEPARTMENTAL CORRESPONDENCE AND MAIL DISTRIBUTION.

THE following description of the method of handling departmental correspondence and means of delivery outlines a very cheap and effective way of insuring promptness in delivery of mail from one department to another.

Correspondence forms shown in Fig. 1 are furnished in pads to all who have any occasion to use them. These forms are 8 x 5 inches, a convenient size for filing. The


SUBJECT Sub-Plant Orders. DATE 2/12/01

To Dept. 21.

Hereafter Sub-Plant Orders for repairs on tools must bear the Manufactured Articles Register number, which will in turn be transcribed to the Expense Labor Cards and serve as a means of identification to Department 5.

Guy P. Miller

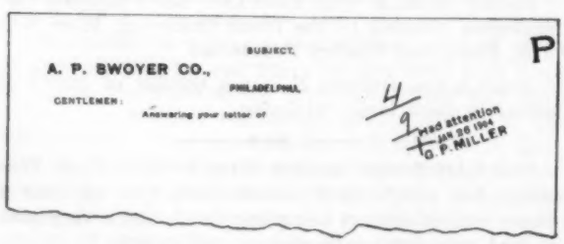
Fig. 1.—Correspondence Form, Measuring 8 x 5 Inches.

date and subject are filled in by the writer of the communication, as well as the number of the department to which it is addressed. When it is desirable to keep a copy a duplicate is obtained by means of carbon paper. The copy is filed under the subject heading for future reference.

These blanks are also used by superintendents and departmental heads for distributing orders, and are filed alphabetically by department numbers, subdivided to subject headings. A record of all orders given is thus kept on file continually. The cost of correspondence blanks in large quantities is only slightly more than the cost of padded paper ordinarily used, and the advantages of a universal size for filing purposes with the corresponding advantages of a constant record in all departments of the business are secured.

Filing boxes for such correspondence are made of heavy cardboard reinforced at the corners, finished in plain black on the outside. Alphabetical guide cards are used.

Each department has two wire baskets, one of which is labeled "Outgoing Mail" and the other "Incoming Mail." These baskets are usually kept on or by the


SUBJECT.

P

A. P. BWOYER CO.,

PHILADELPHIA.

GENTLEMEN:

Answering your letter of

4 9

Read attention JUN 20 1904 G. P. MILLER

Fig. 2.—Illustrating How Letters Are Marked for Different Departments' Attention.

desk of the head of the department. One boy is assigned to go from department to department, and takes from each department all of the mail in the basket labeled "Outgoing Mail" and deposits such communications as he may have for each department in the basket labeled "Incoming Mail." Letters which contain several different subjects and therefore require the attention of several departments are marked by the department first receiving them with departmental numbers, one under each other, as shown in Fig. 2. The department lowest in order having attended to their portion cross off their number, deposit the letter in the basket and it is taken to the department whose number is given next above, and so on to the last department. When all departmental numbers are crossed off it is understood that such letters are to be delivered to the filing and mailing department, where they are filed. In the instance illustrated herewith, Fig. 2, the letter, which starts from Department 1, concerns also Departments 4 and 9 and is so marked, and with the number 1 crossed out and stamped as shown is sent to Department 9, whence it goes to Department 4, and then after attention and similar marking it is ready for filing.

Each clerk is furnished with a dating stamp, as shown in Fig. 2, with name, which costs, including a set of type, $1. Every communication that he checks or attends to is stamped with this stamp before it goes to file. This enables the placing of responsibility in case the matter is afterward referred to and also insures all letters having attention, as the filing and mailing department have instructions not to file letters unless so stamped. In Fig. 3 is shown the style of bag which is used by the

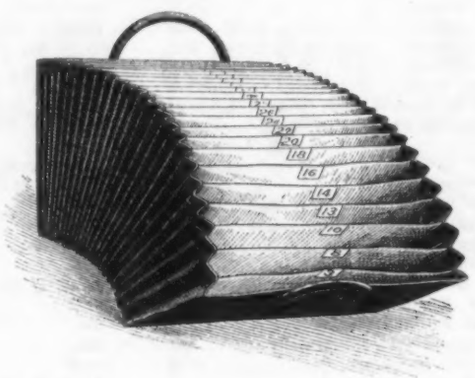


Fig. 3.—Bag Used By Mail Boy.

mail boy during his rounds. This bag is specially made, with heavy canvas divisions between the various compartments, each division being marked with the number of a department, the mail being carried in the division marked with the department number to which it is to be delivered. The boy has a regular schedule of departments and of the times during the day when he is due to arrive at these departments. As this schedule includes all of the factory, as well as the office departments, it takes about one hour to make a trip. As soon as one trip is completed another is commenced. This boy is not allowed to vary the times of calling on departments or to do errands outside of his schedule.

HARDWARE HEADQUARTERS AT ST. LOUIS.

ARRANGEMENTS have been made under the auspices of the National Hardware Association for the maintainance of a Hardware headquarters in St. Louis during the continuance of the fair, and all Hardware merchants and manufacturers without regard to their membership in any association are invited to avail themselves of the opportunities and conveniences thus presented. The headquarters will be in the Missouri Athletic Club, and provision will be made by which cards will be issued to visiting Hardwaremen entitling them to the privileges of this new and handsomely appointed clubhouse. A register will be provided for names and addresses and length of stay in the city, so that visitors may readily be brought into communication with one another. We understand that no formalities are required, the invitation being extended to all in the trade.

HARDWARE EXHIBITS AT THE ST. LOUIS FAIR.

AMONG the Hardware exhibits at the St. Louis World's Fair are the following, to some of which more extended reference will be made in later issues:

THE L. S. STARRETT COMPANY, Athol, Mass., manufacturers of fine Mechanical Tools, are located in the Machinery Building, Block 6. Their exhibit is near one of the main entrances and occupies a conspicuous position.

ABERNATHY VISE & TOOL COMPANY, 90 Illinois street, Chicago, manufacturers of Quick Acting Wood Workers' Vises, &c., have an exhibit in Machinery Hall, Block 6, Aisle 1, where they display a full line of Vises and Benches suitable for manual training equipment.

SAWYER TOOL MFG. COMPANY, Fitchburg, Mass., manufacturers of fine Tools and Hardware Specialties, occupy space in the Machinery Building, Block 6, Section 194. Their exhibit appears in an attractive cabinet of white enamel and gold, the cabinet being 9½ feet high and 15 feet long. The case contains over 1000 pieces of their product, the goods being displayed on a black broadcloth background. At the present time E. D. Garfield, treasurer of the company, is in charge of the exhibit.

VOORHEES RUBBER MFG. COMPANY, Jersey City, N. J., are located in Machinery Hall, Block 34, Aisle 6, where they make an exhibit consisting of miniature machinery, showing a few of their processes of manufacture, some goods being manufactured on the spot. They also make an exhibit of manufactured goods, such as Belting, Packings, Hose, &c. There are some large Rubber Suctions and Dredgers' Sleeves used in Government work, large Belts for special work, fire department Hose, handsome Tiling and Mats executed in colors, showing the possibilities in an artistic way, &c.

THE J. D. WARREN MFG. COMPANY, manufacturers of Hardware Shelving, Cabinets, &c., Chicago, have issued a one-page circular, one side of which shows a ground plan of buildings at the St. Louis World's Fair, together with a view of the Varied Industries Building, with directions for finding their "Model Hardware Store" exhibit. On the reverse side of the circular attention is called to a few leading lines manufactured by the company.

THE NATIONAL ENAMELING & STAMPING COMPANY, in the Palace of Manufactures, have arranged a huge tower 40 feet high, on the sides of which are hung in artistic array thousands of pieces of "Royal" Granite Steel Ware. The tower is 15 feet square at the base, and the artistic arrangement of the Granite Ware on it produces a pleasing and striking effect.

PERHAPS the most startling booth in the Manufactures Building is that of the SIMMONS HARDWARE COMPANY, St. Louis. It is a reproduction of a Dutch wind mill and an arch of triumph, scores of thousands of pieces of Hardware being used in the external decoration. The arms of the wind mill turn, and the center of the triumphal arch is made to represent a waterfall, above which are rapids. The rapids are of Chain, and the waterfall of Chain and Auger Bits; a mechanical device puts these in motion, giving a realistic effect.

JACOB J. VOLRATH MFG. COMPANY, Sheboygan, Wis., show a Tea Pot 12 feet high and 10 feet in diameter, which is a very clever *fac-simile* of their ware. The sign, "The Wear of Quality," is prominently displayed.

THE NATIONAL SWEEPER COMPANY, Marion, Ind., make an elaborate display of their high art Sweepers, including four new models.

THE MAJESTIC STEEL RANGE COMPANY, St. Louis, have built a booth in *fac-simile* of the steamship "Majestic," from which their company was named. This huge exhibit commands attention because of its oddity and its departure from the conventional exhibit booths. The vessel is represented as sailing in a quiet sea, and back of it is a panoramic harbor scene painted on canvas. The deck and pilot of the boat are loaded with Majestic Ranges. In the cabin, to which visitors are admitted, are exhibited Ranges and parts.

STOVE manufacturers of Quincy, Ill., unite in one large booth, which is surmounted by a flag bearing the words, "Quincy—the Largest Stove Center of the World." Included in this exhibit are the EXCELSIOR STOVE MFG. COMPANY, GEM CITY MFG. COMPANY, COMSTOCK-CASTLE STOVE COMPANY, THOS. WHITE STOVE COMPANY, CHANNON-EMERY STOVE COMPANY.

H. MUELLER MFG. COMPANY, Decatur, Ill., have erected in their space a huge pyramid 18 feet high, with 15 x 20 foot base, on terraces of which they display their line of Valves, Cocks, Regulators and other fittings, many thousand pieces being used in the display. They also give a working demonstration of their tapping machine.

F. E. MYERS & BRO., Ashland, Ohio, make in the Palace of Agriculture what they term a live exhibit. A complete line of the Myers Well Pumps, Hay Tools and Spray Pumps are mounted on a revolving pedestal, arranged to display the goods in an attractive manner. In Machinery Hall they exhibit all styles of the Myers Bulldozer Power Pump, Power Working Heads and Power Appliances, as described in their complete catalogue. The company state that they have been prominent exhibitors at the various expositions held during the last 15 years, but that their display at St. Louis is on a more extensive scale than any former one.

J. H. WILLIAMS & Co., Brooklyn, N. Y., manufacturers of Drop Forgings, occupy the southwest corner of Block 32, Machinery Building, their space measuring 35 x 18 feet. In the center they have erected a revolving device, 12 feet in diameter, on the panels of which are mounted examples of rough and finished Drop Forgings, the latter loaned to them by customers, and pictures symbolizing the blacksmith's art. All cabinet work is of quartered oak, and the feature of the fence by which their space is inclosed is the Vulcan Chain Wrench of various sizes.

THE PHILIP COREY MFG. COMPANY, Lockland, Ohio, have a space 30 x 30 feet in Machinery Hall, in the southeast corner of Section 26. Here they have erected a booth of quartered oak, finished with fumed oak. The booth is a handsome piece of work in the mission style of architecture. The exhibit comprises the products of their Lockland, Philadelphia and New England plants, including the Magnesia in its various forms, Magnesia Steam Pipe and Boiler Coverings, Magnesia Locomotive Lagging, Crude Asbestos, Asbestos Fiber, Cloth, Paper, Twine, Board, Packings, &c., showing the entire line from the crude materials to the finished products. A large space in the booth is devoted to a small building showing the various forms of application of their Magnesia Flexible Cement Roofing, and its adaptability to different styles of roofs. The exhibit also includes a complete line of the products of their Roofing and Paint factories. The company advise us that all of the boilers, heaters, breechings, pipes and other connections of the immense power plants, as well as the connections of the private exhibits at the St. Louis Exposition, have been insulated with their 85 per cent. Magnesia Steam Pipe and Boiler Coverings.

AMERICAN IRON & STEEL MFG. COMPANY, Lebanon and Reading, Pa., make an interesting and attractive exhibit in the Manufactures Building, Block 8-B. This exhibit comprises every variety of Bolts, Nuts, Washers, Boiler Rivets, Turnbuckles, Lag Screws, Set and Cap Screws, Railway Spikes and Track Bolts, and a variety of other goods used by railway companies, telegraph and telephone companies and in the construction of bridges, buildings, &c. The goods are tastefully displayed on six large panels convenient for close inspection. The practical mechanic, familiar with the use of such articles, will find many points of excellence in the extensive variety of goods displayed, especially the standard proportions of the heads and nuts of Bolts and the high grade quality of

material used, as well as the excellent finish of the articles displayed. Especial attention will be drawn to the fine grade of material used in the manufacture of Boiler Rivets, as shown by the samples, some of which have been hammered out cold and bent and tortured in various forms without showing any sign of fracture. Railway men will be interested in the display of the Harvey Grip Railway Track Bolts. These Bolts are made of a fine grade of steel and have their threads produced by the cold rolling process, first developed in this country by J. H. Sternbergh of the company.

Four Papers on Advertising.

BY MARSHALL DE MOTTE.

The subjects are not treated in any abstract way, but considered practically, with special reference to newspaper publicity, such as can be used by an ordinary Retail Hardware Merchant. The first paper of the series appeared in our issue February 11.

Second Paper.

HOW TO WRITE YOUR ADVERTISEMENTS.

This little talk is not to the professional ad. writer, but is intended to help the store man to do the talking part of his own ads. as well as he does his talk to his customers, for you must remember that your ad. is your salesman.

TO DECEIVE OR NOT TO DECEIVE?

Make up your mind to answer this question squarely before we get into the matter any further. Much of the ineffective advertising that I have seen has been so more from want of truthfulness than from want of salesmanship merit. Why, there is something almost irresistible about the plain, unvarnished truth, told in the homely phrases of the store talk. You will be told that the great department stores grossly misrepresent in their advertising. Well, some do; likewise some are vastly more successful than others, and you will find that the truly great mercantile concerns scorn deception as a means of securing business. It is not that honesty is the best policy, but that honesty is the only policy. This is especially so in advertising. Therefore decide to make it "Not to Deceive."

FIRST AND ALWAYS, BE YOURSELF.

I can say this to a business man without hesitation, for we all know that the successful man has a clear way of thinking and as clear a way of speaking. Now, if he will only be as clear in his way of talking through his ads., they will be just as successful. Most professional men are too wordy to be successful business men. Their language style shows their habits of thought. The business tongue is direct, convincing, pleasing, intelligible. You do all this unconsciously. People will expect your ads. to talk as you do, and it's "heaps" easier to say things in your own natural way if you only think so.

AN ATTRACTIVE OPENING PHRASE.

Frequently a catchy headline will draw attention to an ad. otherwise without distinguishing characteristic, but let me impress one thing on your mind—your headline should be relevant to the subject of the ad. All good advertisers deprecate the use of "scare" lines that have for their intent the catching of the eye, but which do not in any way draw the mind to the ad. itself. Joking in advertisements is a doubtful practice. A little pleasantry once in a while is admissible, but if you are capable of regularly entertaining people with your jokes you will find it more profitable to turn Dooley and give up the retail Hardware business. For every season as it comes there are many headlines that will suggest themselves to you instantly, and will suggest your whole ad. also. Choose one with some consideration for the size of the ad. you purpose writing—that is, whether one or two or more columns wide—and plan it so that you can use a size of type that will catch the eye but not be unnecessarily large. Here are some suggestive lines off-hand: "*Spring Needs*," "*A Good Heater*," or for two columns, "*The Heater You Need*," "*You Want These Tools*," "*A Range Worthy Your Cook*," &c.

DESCRIPTION OF THE LEADER.

It's a good plan to center your small ad. around a single article or line, and to make your talk about that in

A Good Heater.

Good in that it is always ready—will respond at once—will work wherever you put it—is clean and safe as well as convenient, portable and inexpensive.

Aluminum Oil Heaters are inexpensive to buy and very cheap to use. A little heat when you want it may save a Doctor's Bill.

Bargain Aluminum $4.50.

All prejudice against Oil Heating Stoves has been conquered by this make of stoves.

500,000 sold attest their popularity. One of these four sizes will suit you:

Bargain heater, like cut, 8 inch circular wick for . . .	**$4.50**
No. 24. Stands 30 inches high, 8 inch wick, for	**$6.00**
No. 30. Stands 32 inches high, 10 inch wick, for . . .	**$7.00**
No. 45. Largest made, 36 in. high, 15 in. wick . . .	**$10.00**

All have Safety Burners.

While we are talking about stoves, don't you need a new range this fall? A comfortable kitchen with a good range will make itself felt through the whole family, and when it comes down to results there is no range quite up to our

Magnificent.

To give you a good excuse to visit our stove section we offer for tomorrow:

A cold handle poker, either straight or bent, just what you want, and for one day only, at . . . . . 3c.

HARDWARE & CO.

your conversational, goods selling style. Then such articles as you wish can be brought in incidentally, either as related goods or under the shadow of the leader. Now,

here is where your salesmanship must come in. You know how to lead a customer on to something she has not asked for, and so you must do in your ads. Don't get the "buck fever," but just quietly and naturally lead to it. Let's try one of these heads on a single column ad.

Well, that's about the way I talk; how is it with you and your inside salesmen? Then why not teach your ads. to talk in the same style? It's easy to do, and it pays.

SIGNATURE AT THE BOTTOM.

After all I have said about catchy opening lines, it is left that the signature must go to the bottom of your ad. Well, that's the very best place for it, and just where you will find it in most small ads. Your experience will bear me out in this assertion.

ALWA YS MENTION PRICES.

Yes, I say always. An ad. may sound well without a price, but it won't pull well, and it's the pull, not the sound, that we judge ads. by. Every price quoted need not be a cut price, though I know a large merchant who won't let anything be advertised except at a cut in price. When you call attention to seasonable merchandise you can give your regular prices, but it will pay to occasionally have a cut price sale, and, when you do, you should make the fact that the prices are cut and special for the sale stand out in a definite manner. Here is where some fall down. One should never quote a price as special or cut for the sale unless it is so. You know the impression you are trying to create in the minds of the readers of your ad. and should see to it that they get no wrong impression, as they certainly will if you misrepresent in this particular.

EXCUSE FOR A SALE.

I don't believe in fake sales. No more do you. It is said of some merchants that the smoking of an election cigar in their store is enough to cause them to have a fire sale, and the putting on of their screen doors an alteration sale. That's flim flam. However, a legitimate excuse for clearing stock, like a removal, substantial alteration, a bad season with a lot of seasonable goods left over, or a change in business, can be made to bring great results in advertising, and should be worked to the limit.

THOUGHT CRAMPS.

Don't get 'em. Just watch that man writing. He has his tongue between his molars, his feet locked in a death grip under the legs of his chair, his index finger "sway backed" under a pressure that almost breaks his pencil and the cold sweat standing on his brow. Is he writing a death sentence or preparing to commit some great crime? Neither. He is trying to write an ad., but he won't succeed. If he had a clerk as bashful and ill at ease in the presence of a customer as he is at writing that ad., he'd advise the young man to get a job as chambermaid for a milk man, where he wouldn't have to meet people. See here, Mr. Merchant; it's just as easy to talk on paper as to talk through the telephone or face to face with a customer, and that's the way to write an ad.; and, furthermore, that is the only way. If you feel that it's too late to "teach an old dog a new trick," turn the job over to a clerk and see that he sticks to the conversational style, is brief and to the point, and, above all and through all, is square in all his representations.

[The writer of these papers has given a touch of realism to his work by describing actual merchandise, as in the sample ad. above. This is not to be construed as advertising, but as an object lesson.—*Ed.*]

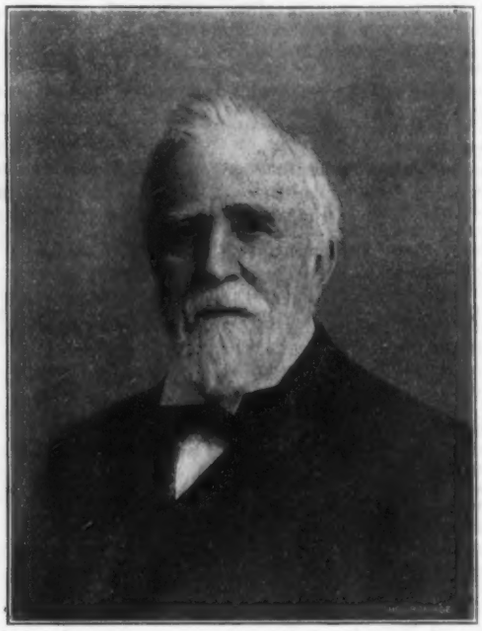
THE Hardware firm of Ridley & Eaton, Brunswick, Maine, have been dissolved by mutual consent, Mr. Ridley selling his interest to C. O. Eaton, the junior member of the house, who has incorporated the business under the name of Eaton Hardware Company, who will continue in the Hardware, Stove, Plumbing, Steam and Hot Water Heating line. Mr. Eaton is treasurer and manager of the company.

CONTENTS.

WM. H. HART'S HALF CENTURY WITH THE STANLEY WORKS.

WILLIAM H. HART, president of the Stanley Works, New Britain, Conn., was the recipient of many tributes of esteem and affection on Monday, 16th inst., when he completed 50 years of service with this old and widely known manufacturing house. Mr. Hart began his connection with the company May 16, 1854, when he was elected secretary and treasurer of the corporation, which was formed in 1852 by Frederick T. Stanley, who five years previously had begun making Wrought Bolts, Hinges and Door and Chest Handles. Mr. Hart continued to fill this office until February 14, 1885, when he was chosen president and treasurer.

The Stanley Works plant closed for the day by vote of the directors. From 9 to 11 o'clock the directors held a reception for the employees and nearly 1200 men embraced the opportunity to be present. The office was handsomely decorated for the occasion, a portrait of the president having a conspicuous position. From 11 to 12



WM. H. HART.

o'clock there was a reception for the stockholders. Edgar Reed, president of the Reed & Prince Mfg. Company, Worcester, Mass., made a congratulatory address, paying high tribute to Mr. Hart, who responded with a brief speech in which he referred to the enviable position held by the Stanley Works in the world's markets as the largest producers anywhere of Wrought Butts and Hinges and the high quality of their product. Mr. Hart referred feelingly to Frederick T. Stanley, testifying also to the loyal support of present associates occupying responsible official positions, naming many of them, as well as the late Peter McCartee, for over 40 years the efficient manager of their New York branch.

In the evening the directors gave a reception at Mr. Hart's residence. The Board of Directors, comprising Abiram Chamberlain, Governor of Connecticut; C. P. Goss, of Waterbury; L. H. Pease, George P. Hart, E. N. Stanley and E. E. Moore, of New Britain, with Mr. Hart, received the guests, and during the evening Governor Chamberlain, on behalf of the corporation, presented Mr. Hart with a magnificent hall clock made by Tiffany & Co. Many telegrams of congratulation were received during the evening from business and personal friends all over the country, indicating the very high esteem in which Mr. Hart is universally held, among them the following from the National Hardware Association: "The National Hardware Association extend hearty congratulations on this your fiftieth anniversary as treasurer of the Stanley Works. Samuel A. Bigelow, President."

Mr. Hart also received other tokens commemorative of the occasion. A beautiful sterling silver loving cup was the gift of the employees. One of its three faces contains the trade-mark of the Stanley Works. Another space shows a Ball Bearing Butt, while the third contains an appropriate inscription. The rolling mill employees presented a gold headed cane; the office a silver fruit dish and platter, and the shipping department a design in roses, with the dates "1854-1904." Patrick B. Smith, a night watchman, gave Mr. Hart a bouquet of 50 roses, in memory of a shamrock which Mr. Hart brought him from Ireland 20 years ago.

Mr. Hart is president of the Young Men's Christian Association Board of Directors, a charter member of the New Britain Club, a prominent member of the South Church and a director of the New Britain General Hospital. He is interested in other manufacturing enterprises, and is a director of the New Britain National Bank.

BRITISH LETTER.

Offices of *The Iron Age*, HASTINGS HOUSE, NORFOLK ST., LONDON, W. C., May 7, 1904.

The Week's Hardware Trade.

The demand in the provinces for General Hardware is better than for some time past, but money is scarce. Accounts are generally overdue, particularly in the northern and eastern agricultural districts. London trade is disappointing, but Scottish demands improve and the Irish trade is well maintained. Yorkshire and Lancashire are experiencing the benefits now of the breakdown of the cotton corner, and orders are more plentiful. The seaside towns and other places of holiday resort are now buying freely, orders running mostly on Cooking Utensils, Table Ware, Lamps and Metallic Bedsteads. The town trade runs largely on Garden Tools and Appliances, Carriage Iron Work, Wheels and Axles, Nuts, Bolts and Rivets, but the brass foundry trade branch is slack, except in a few special lines. Machine made brass foundry, such as Hinges, Door Plates, Cabinet Drawer and Sunk Handles, is selling well. Public taste in these goods makes now for simplicity and against that over-ornamentation, which for so long has been an eyesore to any person of average good taste. In Sporting Guns there is slow progress and dissatisfaction is expressed at the inroads of foreign competition. At the meeting of the Birmingham Gun trade, held this week, it was pointed out that, although the number of barrels proved there last year was 427,474, nearly one-fourth of the total consisted of barrels for cheap African Guns made in Belgium. Japanners are now busy on season goods, and Builders' Iron Mongery is being purchased more freely. There is a good demand for Hurdles, Iron Fencing, Iron Gates and similar goods. In the Lock trade, the demand is still for best qualities, but the call for medium and cheaper qualities is slackening. In Willenhall the Lock trade generally is quiet, and only four days a week can be found for the men. One influential firm that up to the present have been able to keep their men going regularly, have this week been compelled to reduce the time of the men.

On foreign account Australia continues a good customer, as also does New Zealand, and Indian orders are up to average. The South African trade is most disappointing. Satisfactory lines, however, have been received during the week from South America and the West Indies, but our dealings with Europe are unsatisfactory.

"False Consignments" in the Hardware Trade.

A test case of considerable importance came before the Birmingham Police Court this week, when a firm of Hinge, Bolt and Nut manufacturers for having on a certain date applied a false account (classification) to certain goods, namely, cases of Hinges, with intent to avoid the payment of (railroad) tolls in respect to such goods, were fined £3 and costs.

In regard to Hinges, Nuts and Bolts, there was a differential tariff. The rate for Hinges was larger than it was for Bolts, and in this case the charge was that the defendant did cause and make a false declaration as to two consignments which were delivered to the London and Northwestern Company on January 26 and 27. In both cases the goods were delivered to the company as Bolts, whereas they were Hinges.

ENTERTAINED BY THE NEW BRITAIN MANUFACTURERS.

THE members of the Executive Committee of the National Hardware Association were the guests of the Hardware manufacturers of New Britain Thursday and Friday of last week. The committee went to New Britain from Boston, where they had been holding their regular spring meeting. The visitors were given a most cordial reception. A luncheon and reception in their honor was given at the New Britain Club from 1 to 3 o'clock Thursday afternoon, at which Mayor Bassett, President A. H. Abbe of the New Britain Business Men's Association and other prominent citizens received with the manufacturers. The remainder of the afternoon was occupied in visiting the various Hardware manufacturing establishments of the city. At 5 o'clock the visitors were taken to the Farmington Country Club, where a dinner was given in their honor. Vice-President Charles M. Jarvis of the American Hardware Corporation acted as toastmaster. Charles E. Mitchell of New Britain, former United States Patent Commissioner, delivered an address of welcome, and Samuel A. Bigelow of the Bigelow & Dowse Company, Boston, president of the National Association, responded for the visitors. Other speakers were Governor Chamberlain of Connecticut; John C. Koch of the John Pritzlaff Hardware Company of Milwaukee, vice-president of the association; ex-Mayor George W. Corbin; S. Norvell of the Norvell-Shapleigh Hardware Company, St. Louis; T. James Fernley, secretary of the National Association, and Howard S. Hart of the Russell & Erwin Mfg. Company. The visitors passed the night at the Country Club, and devoted Friday to a further inspection of the manufacturing plants of the city.

OSHKOSH HARDWARE MFG. COMPANY.

THE OSHKOSH HARDWARE MFG. COMPANY organized last week at Oshkosh, Wis., with $150,000 capital stock fully paid in. The company will at once erect a large plant, in which they will manufacture a complete line of medium grade Builders' Hardware, and also a large and varied line of Hardware for Refrigerators. About 30 citizens of Oshkosh comprise the stockholders. The incorporators are Edgar P. Sawyer, Charles W. Radford, John Challoner, James H. Wall and George B. Hilton. John Challoner, treasurer of the Challoner Company, will be manager of the new company.

MISCELLANEOUS NOTES.

Hopkins & Allen Junior Rifles.

Hopkins & Allen Arms Company, Norwich, Conn., are about to put on the market their well-known Hopkins & Allen Junior rifles in a genuine Schuetzen pattern—Schuetzen butt plate and stock. They will be made in 22 and 25-20 calibers.

Star Hack Saw Frame.

The Millers Falls Company, Millers Falls, Mass., and 28 Warren street, New York, have recently put on the market a modified form of their Star hack saw frame, to be known as No. 21. It is designed for 8-inch blades. The back is made of superior stock and will retain its shape. The steel parts are nickeled, and the handle, of hard wood, is stained black. The manufacturers commend this saw frame to the trade as a reliable article at small cost.

Noiseless Rail for Store Ladders.

The Bicycle Step Ladder Company, Chicago, have perfected what they style their Noiseless rail, for use in connection with their Chicago or Bicycle store ladders. They announce that long experience and repeated tests convince them that their new style of noiseless track is preferable to the use of rubber tired wheels on the ladder, as the track is practically everlasting and is as noiseless when old as when new.

Rope Dressing.

Durable Wire Rope Company, 22 Atlantic avenue, Boston, Mass., who manufacture special cable laid durable wire rope hawsers for mooring ropes, dock fasts, &c., also wire elevator rope and ship and yacht rigging, are putting on the market a rope dressing which, they state, will keep wire rope from rusting and by lubricating the strands will increase the life of cables from 50 to 100 per cent. This dressing is referred to as being equally well adapted for use on Manila rope. The dressing is put up in 10-pound pails, attractively labeled.

Marlin Repeating Rifles, Grade B.

The Marlin Firearms Company, New Haven, Conn., are now arranging a line of their well-known repeating rifles, Model 1893, to be known among the trade as Grade "B." These rifles will be in every respect the same as the regular Model 1893, with the exception that the barrels will be made of the highest grade of soft gun barrel steel instead of their "Special Smokeless Steel." The intention is to meet the demand for a high class, carefully made arm on the part of the many shooters who are not sufficiently interested in the smokeless steel barrels to pay the extra cost. The new line is, of course, not intended for high power smokeless ammunition, and its use in this grade is not advised by the makers; only black powder ammunition and equivalent loads, such as low power smokeless should be used. The 0.32-40 and 0.38-55 sizes only will be made in this grade. The line will consist of the carbine with 15-inch round barrel weighing 6¼ pounds, and carrying five shots, or with 20-inch round barrel weighing 6¾ pounds, and carrying seven shots. With the regular round barrels in 26 to 32 inch lengths the rifle may be had, weighing 7 to 7¾ pounds. Octagon barrels are furnished 26 to 32 inches long, the rifles weighing 7½ to 8½ pounds. These rifles can be furnished in short, half or full magazine. They accommodate a wide range of cartridges, and all the popular ammunition with the exception noted above regarding high power smokeless powder.

Automatic Gas Burner.

The National Safety Gas Burner Company, Providence, R. I., have begun the manufacture of a new automatic burner invented and patented by G. L. Palmer of that city. This device is designed to guard against the frequent accidents, often fatal, resulting from the extinguishing of a gas light without shutting off the source of supply, and from the escape of gas incident to the accidental opening of the supply valve. This is accomplished by the automatic opening and closing of a valve by means of a thermostat depending upon the heat or lack of heat from the burner. The upper arms of a plate punched out of sheet metal are bent close over the tip, and the lower end is carried down close to the side of the burner. The loop over the tip has a slot through which the gas passes. Inside the burner is a short plug in which are two round openings, one parallel with the length of the burner, for the passage of the gas, the other at right angles to the first and exactly intersecting it. In this latter passage works a pin forming a miniature piston valve. The outer end of the pin is attached to the metal strip. Forcing the strip away from the burner takes the inner end of the pin past the gas opening, permitting a supply of gas to reach the tip. This is accomplished by the action of the thermostat, or by means of a chain, which is employed when it is desired to light the burner. The thermostat is formed by hard soldering a strip of metal to the loop over the tip. Thus when the gas is not ignited the supply is entirely cut off by means of the valve. To ignite it the chain is pulled and held open for two or three seconds during which time the warmth of the lighted match works on the thermostat. This will happen as well if the valve is not held open by means of the chain. The expansion of the metal of the thermostat will hold the valve in its open position. Full illumination comes after a few seconds. When the

flame is extinguished either by design or accident the removal of the heat from the expanded metal causes it to contract and the supply of gas is shut off in the burner itself, although the regular gas cock may still be open. No gas can pass through the burner until the thermostat has been again heated.

Granite State and New Ideal Lawn Mowers.

Granite State Mowing Machine Company, Hinsdale, N. H., successors to Newhall & Stebbins, have embodied their latest improvements in the mowers shown herewith. The machine illustrated in Fig. 1 is provided with ball bearings. The axle tree on which the driving wheels and cutting knives revolve is cast steel, and the mower

Fig. 1.—The Granite State Ball Bearing Lawn Mower.

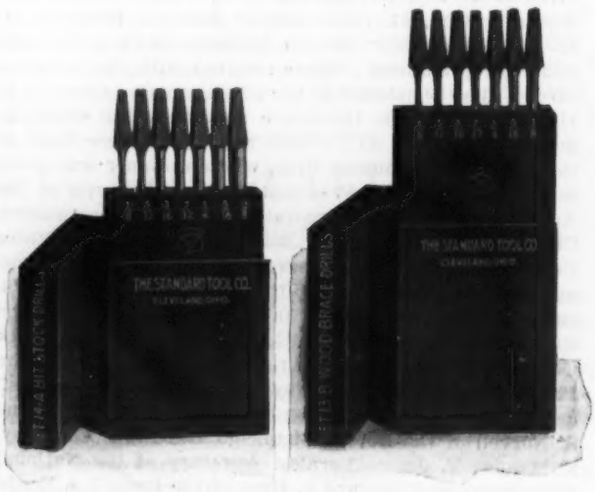
is referred to as being simple in construction. Among points of excellence the following are alluded to by the makers: That the mower has a minimum amount of friction, as the gearing produces no pressure on the cutter cylinder journals; that there is little wear on the journals and boxes, making it durable, light draft, easily operated and not liable to require frequent repairing, and that each part is thoroughly and nicely constructed after a pattern, and any part can be duplicated. The

Fig. 2.—The New Ideal High Wheel Lawn Mower.

Ideal mower, shown in Fig. 2, has wheels 10 inches in diameter, with a four-blade revolving cutter 6⅝ inches in diameter. The handle is easily detached from the mower, which is provided with a noiseless ratchet. Both mowers are made in 14, 16, 18 and 20 inch sizes, and in addition the Granite State machine is made in 12-inch size.

Sets of Bit Stock and Wood Brace Drills.

The Standard Tool Company, Cleveland, Ohio, are offering their bit stock and wood brace drills, sets 14-A and 13-B, containing drills, ⅛ to ⅜ inch by thirty-seconds,



Sets of Bit Stock and Wood Brace Drills.

in flat leatherette cases, as here illustrated. The drills fit in holes drilled for each size, which is plainly marked on the box in gold. These compact cases, while convenient to carry in the pocket, will also be found useful in the tool chest, as they take up but little room, and the drills can always be found clean and ready for use. Where economy in preserving drills is a consideration these handy sets may be considered worth the cost, which is but little more than that of the drills themselves.

Peerless Wagon Bed Jack.

The jack shown herewith is designed for doing the heavy lifting of blacksmiths' and wagon shops, when repairing vehicles. The jack is instantly adjusted by raising or droppeing the standard, working automat-

Peerless Wagon Bed Jack.

ically: raising by working the handle below the center and lowering by working the handle above the center. The device is 37 inches high, weighs 14 pounds and raises 12 inches. The manufacturers remark that with the jack a boy can do all the heavy lifting required in taking out springs, axles, &c., for repairs, and that with a jack at each corner a wagon of 3500 pounds or more can be raised clear of the floor. The jack is offered by the Oliver Mfg. Company, Chicago, Ill.

The Eye Key Ring.

The Leroy Novelty Company, Newark, N. J., are offering the key ring shown herewith. By pushing the key on the eyelet the ring opens itself, making the operation of putting keys on the ring an easy one and avoiding broken finger nails. The rings are put up a dozen on a card, assorted, nickel, oxidized and gold finish.

The Eye Key Ring.

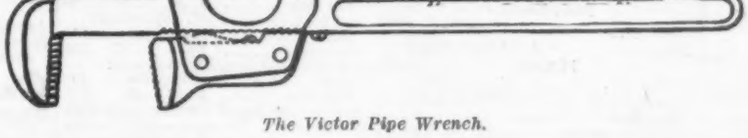
Stevens Little Krag No. 65.

J. Stevens Arms & Tool Company, Chicopee Falls, Mass., are putting on the market the rifle shown herewith, which is particularly adapted to the use of boys and is constructed on the principle of the United States Krag-Jorgenson rifle. It comprises but few parts and can be readily taken apart when necessary to clean it or to replace pieces that may become injured. One special feature that the rifle embodies is that if the barrel is spoiled it can be easily removed by turning the barrel screw, and a new barrel inserted quickly without the use of any tools. The bolt head can be removed, and contains the firing pin, so that if anything should happen to the pin a new one can be easily inserted at little expense. The rifle is cocked by drawing back the hammer, which is made with a large knurled head. When the rifle is cocked it is locked, so that it is impossible to open it until the hammer falls or is let down. The rifle is furnished with either rear peep or open rear and open front sights. Rear peep and open front sights will be regular, and rifles will be so supplied unless otherwise ordered. The barrel is round, 20 inches long, blued steel frame, single trigger, oiled walnut stock and forearm, with rubber butt plate. The rifle will shoot 0.22 long rifle rim fire cartridges, also C. B. caps, 0.22 short and 0.22 long cartridges. The rifle weighs 3¼ pounds.

Stevens Little Krag No. 65.

The Victor Pipe Wrench.

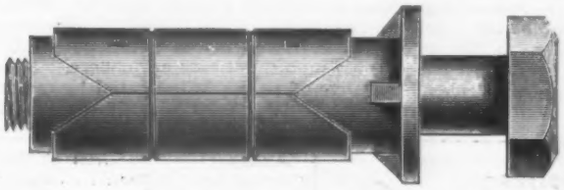
The Victor pipe wrench, herewith shown, is the product of the C. E. Bonner Mfg. Company, Chrisman, Ill., who claim for it quickness of adjustment, simplicity and durability. The bar and jaws of the wrench are drop forged from steel. To manipulate the wrench the thumb is placed on the box on the top of the bar, which contains a coil spring and sliding shoe. Pressure upon the box permits the short jaw to be moved backward or forward freely, saving much time. The jacket or rivets, it is claimed, are not subjected to strain at any time, the milling of the short jaw and the under main bar taking the pressure until the jaws fasten on the pipe, when the short jaw at the front end travels up, increases the hold upon the pipe and, coming in contact with the upper bar, takes all additional pressure from milling. The wrench is made in varying lengths from 6 to 24 inches, inclusive, and capable of holding pipe ⅛ to 2½ inches.



The Victor Pipe Wrench.

A New Naval Double Expansion Bolt.

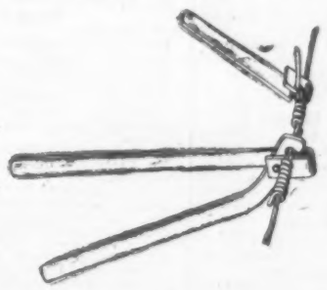
The Steward & Romaine Mfg. Company, Philadelphia, Pa., are manufacturing the expansion bolt shown herewith, under specification of the Government Bureau of Yards and Docks, for fastening the bilge blocks, slides, &c., to the stone and concrete walls in navy yards. The bolts are made of Government composition, 88 parts copper, 10 parts tin and 2 parts zinc. They are also making the bolts in annealed steel. The construction of the bolt is the same as the company's regular double expansion bolt, except that the nut nearest the head of the bolt is constructed with a collar or washer having two or more shoulders, being cast as part of the nut. The hole in the stone or cement is cut so that the collar comes flush with the surface, and the shoulders fit into the grooves cut for them. It is pointed out that it is impossible for the expansions to turn in the hole, and that the fit is perfect.



A New Naval Double Expansion Bolt.

The Tight Grip All Steel Wire Clamp.

In the wire clamp here illustrated A. B. Probasco, Lebanon, Ohio, is offering to the trade a splicing tool for erectors of wire farm fencing. The arrangement of the jaws is such that the wire ends gripped by it cannot slip and afford an especially tight grip while the auxiliary splicer is being used to wind or coil the wire ends. The tool is made sufficiently long to secure a powerful leverage, and is alluded to as being light, strong and durable and as made of the best material.



The Tight Grip All Steel Wire Clamp.

Current Hardware Prices.

REVISED MAY 17, 1904

General Goods.—In the following quotations General Goods—that is, those which are made by more than one manufacturer, are printed in *Italics*, and the prices named, unless otherwise stated, represent those current in the market as obtainable by the fair retail Hardware trade, whether from manufacturers or jobbers. Very small orders and broken packages often command higher prices, while lower prices are frequently given to larger buyers.

Special Goods.—Quotations printed in the ordinary type (Roman) relate to goods of particular manufacturers, who are responsible for their correctness. They usually represent the prices to the small trade, lower prices being obtainable by the fair retail trade, from manufacturers or jobbers.

Range of Prices.—A range of prices is indicated by means of the symbol @. Thus 33⅓ @ 33⅓ & 10% signifies that the price of the goods in question ranges from 33⅓ per cent. discount to 33⅓ and 10 per cent. discount.

Names of Manufacturers.—For the names and addresses of manufacturers see the advertising columns and also THE IRON AGE DIRECTORY, issued May, 1904, which gives a classified list of the products of our advertisers and thus serves as a DIRECTORY of the Iron, Hardware and Machinery trades.

Standard Lists.—A new edition of "Standard Hardware Lists" has been issued and contains the list prices of many leading goods.

Additions and Corrections.—The trade are requested to suggest any improvements with a view to rendering these quotations as correct and as useful as possible to Retail Hardware Merchants.

Abrasives—

Adamite in Carloads:
Crystal ₩ ton $90@100
Grain ₩ ton $120@140
See also *Emery*.

Adjusters, Blind—

Domestic, ₩ doz. $3.00 33⅓%
North's 10%
Zimmerman's—See *Fasteners, Blind.*

Window Stop—

Ives' Patent 35%
Tapiin's Perfection 35%

Ammunition—See *Caps, Cartridges, Shells, &c.*

Anvils—American—

Armand Hammer, Wrought ₩ 8¼@8¾c
Buel Patent Trenton ₩ lb 9¼@9¾c
Eagle Anvils ₩ lb 7¼@7¾c
Hay-Budden, Wrought 9@9¼c
Horseshoe brand, Wrought 9@9¼c

Imported—

Peter Wright & Sons ₩ lb 10½c

Anvil, Vise and Drill—

Millers Falls Co., $18.00 15&10%

Apple Parers—See *Parers, Apple, &c.*

Aprons, Blacksmiths'—

Hull Bros. Co 30&5%
Livingston Nail Co 33⅓%

Augers and Bits—

Com. Double Spur 75@75&5%
Boring Machine Augers 66⅔@70%
Car Bits, 12-in. twist 60@60&10%
Jennings' Pattern 50&10&5@60%
Ford's Auger and Car Bits 40&5%
Forstner Pat. Auger Bits 25%
C. E. Jennings & Co.:
No. 10 ext. lip. R. Jennings' list 25&10%
No. 30. R. Jennings' List. 40&7½&10%
Russell Jennings' 25&10&2½%
L'Hommedieu Car Bits 15&10%
Mayhew's Countersink Bits 45%
Millers' Falls 50&10&7½%
Ohio Tool Co.'s Bailey Auger and Car Bits 40&10%
Pugh's Black 20%
Pugh's ennings' Pattern 35%
Snell's Auger Bits 60%
Snell's Bell Hangers' Bits 50&10%
Snell's Car Bits, 12-in. twist 60%
Wright's Jennings Bits (R. Jennings' list) 50%

Bit Stock Drills—

See *Drills, Twist.*

Expansive Bits—

Clark's small, $18; large, $26 50&10%
Clark's Pattern, No. 1, ₩ doz., $26; No. 2, $18 50&10%
Ford's, Clark's Pattern 50&10@60%
C. E. Jennings & Co., Steer's Pat. 25&10%
Swan's 60%

Gimlet Bits—

Common Double Cut..gro. $2.00@2.25
German Pattern.....gro. $4.50@4.75

Hollow Augers—

Bonney Pattern, per doz. $10.00@11.00
Ames 25&10%
New Patent 25&10%
Universal 20%
Wood's Universal 25%

Ship Augers and Bits—

Ford's 40%
C. E. Jennings & Co.:
L'Hommedieu's 15&10%
Watrous' 33⅓&10%
Ohio Tool Co.'s 40%
Snell's 40%

Awl Hafts, See *Hafts, Awl.*

Awls—

Brad Awls:
Handled gro. $2.75@3.00
Unhandled, Shouldered gro. 63@66c
Unhandled, Patent gro. 66@70c
Peg Awls:
Unhandled, Patent gro. 31@34c
Unhandled, Shouldered gro. 65@70c
Scratch Awls:
Handled, Common gro. $3.50@4.00
Handled, Socket gro. $11.50@12.00
Hurwood 40%

Awl and Tool Sets—See *Sets, Awl and Tool.*

Axes—

First Quality $5.50@6.00
Second Quality $4.75@5.25

Axle Grease—See *Grease, Axle*

Axles—Iron or Steel

Concord, Loose Collar 5@5½c
Concord, Solid Collar 5@5½c
No. 1 Common 4@4½c
No. 1¼ Com. New Style 4½@5c
No. 2 Solid Collar 4¾@5¼c
Nos. 7, 8, 11 and 12 60c&5@60c&10%
Nos. 13 to 14 60@5@60c&10%
Nos. 15 to 18 60c&10@70%
Nos. 19 to 22 60c&10@70%

Boxes, Axle—

Common and Concord, not turned.. lb. 4¼@4¼c
Common and Concord, turned lb. 5@5½c
Half Patent lb. 9@9½c

Bait—Fishing—

Heudryx:
A Bait 30%
B Bait 25%
Competitor Bait 20&5%

Balances—Sash—

Caldwell new list 50%
Pollman's 60%

Spring—

Spring Balances 60@60&5%
Chatillon's:
Light Spg. Balances. 40&10%
Straight Balances. 40%
Circular Balances 50%
Large Dial. 30%
Pelouze 50%

Barb Wire—See *Wire, Barb.*

Bars—Crow—

Steel Crowbars, 10 to 40 lb., per lb. 3@3½c

Towel—

No. 10 Ideal, Nickel Plate ₩ gro, $8.50

Beams, Scale—

Scale Beams, List Jan. 12, '82 40&10%
Chattillon's No. 1 30%
Chattillon's No. 2 40%

Beaters—Carpet—

Holt-Lyon Co.:
No. 12 Wire Coppered ₩ doz $0.55; Tinned $1.00
No. 11 Wire Coppered ₩ doz. $1.10; Tinned $1.20
No. 10 Wire Galvanized ₩ doz. $1.75
Western W. G. Co.
No. 1 Electric ₩ gro. $7.80
No. 2 Buffalo ₩ gro. $9.00
No. 3 Perfection Dust ₩ gro. $8.00

Egg—

Holt-Lyon Co.:
Holt, No. A, Japanned ₩ doz. $1.20
Holt, No 1, Tinned ₩ doz. $1.50
Holt, No. B, Japanned ₩ doz. $2.00
Holt, No. 2, Tinned ₩ doz. $2.25
Lyon, No 2, Japanned ₩ doz. $1.25
Lyon, No. 3, Japanned ₩ doz. $1.50
Lightning Chain, ₩ gro. $15.00
National Mfg. Co.: ₩ gro.
No. 1 Dover, Family size $7.00
No. 2 Dover, Hotel size 14.00
Taplin Mfg. Co.: ₩ gro.
No. 60 Improved Dover $6.00
No. 75 Improved Dover $6.50
No. 100 Improved Dover $7.00
No. 102 Improved Dover, Tin'd. $8.50
No. 150 Improved Dover, Hotel $15.00
No. 152 Imp'd Dover, Hotel, T'd. $17.00
No. 200 Imp'd Dover Tumbler $8.50
No. 202, Imp'd Dover Tumbler, Tin'd. $9.50
No. 300, Imp'd Dover Mammoth, ₩ doz $25.00
Western, W. G. Co., Buffalo $7.00
Wonder (S. S. & Co.) ₩ gro. net, $6.00

Bellows—

Blacksmith, Standard List..75@75&5%

Blacksmiths'— *Net Prices.*

Inch..	30	32	34	36	38	40
Each	$3.50	3.75	4.25	4.80	5.35	6.15

Extra Length:
Each $4.00 4.55 5.10 5.60 6.40 7.50

Molders— *Net Prices.*

Inch	10	12	14
Doz	$8.50	10.00	13.00

Hand— *Net Prices.*

Inch	6	7	8	9	10
Doz	$4.25	4.50	5.00	6.50	7.75

Bells—Cow—

Ordinary goods 75&5@75&10%
High grade 70&10@70&10&5%
Jersey 75&10%
Texas Star 50%

Door—

Abbe' & Gong 45%
Barton Gong 50%
Home, R. & E. Mfg. Co.'s 55&10%
Lever and Pull, Sargent's 60&10&10%
Yankee Gong 35%

Hand—

Hand Bells, Polished, Brass 60& @60&10%
White Metal 60%
Nickel Plated 50@50&5%
Swiss 60@60&7½%
Cone's Globe Hand Bells 33⅓@33⅓&10%
Silver Chime 33⅓@33⅓&10%

Miscellaneous—

Farm Bells lb. 2¼@2½
Steel Alloy Church and School 50&10@60&5%
American Tube & Stamp'g Co. Gongs 75%
Table Call Bells 50@50&10%
Trip Gong Bells 55&10@60%

Belting—Rubber—

Agricultural (Low Grade)..75@75&5%
Common Standard 70@70&10%
Standard 65@70%
Extra 60&5@60&10%
High Grade 50&5@50&10%
Boston Belting Co.:
Seamless Stitched Imperial 45&5%
Boston 50&5%
Niagara 60&5%

Leather—

Extra Heavy, Short Lap....60@60&5%
Regular Short Lap 60&10@60&10&10%
Standard 70@70&5%
Light Standard 70&10%
Cut Leather Lacing 60&10%
Leather Lacing Sides, per sq. ft.. 18c

Bench Stops—See *Stops, Bench*

Benders and Upsetters, Tire—

Detroit Perfected Tire Bender 40%
Green River Tire Benders and Upsetters 20%
Detroit Stoddard's Lightning Tire Upsetters, No. 1, $4.25; No. 2, $7.25; No. 3, $10.50; No. 4, $16.25; No. 5, $30.50.

Bicycle Goods—

John S. Leng's Son's 1902 list:
Chain 50%
Parts 50%
Spokes 50%
Tubes 60%

Bits—

Auger, Gimlet, Bit Stock Drills, &c.—See *Augers and Bits.*

Blocks—Tackle—

Common Wooden 70@10@75@5%
Hollow Steel Blocks, with Ford's Patent Sheaves 50&10%
Lane's Patent Automatic Lock and Junior 30%
Stowell's Novelty, Mal. Iron 50&10%
Stowell's Self Loading 60%
See also *Machines, Hoisting.*

Boards, Stove—

Zinc, Crystal, &c. 30&10@40&5%

Bolts—Carriage, Machine, &c.—

Common Carriage 75@ %
Phila. Eagle, $3.00 list May 24, '99.... 80@80&10%
Bolt Ends, list Feb. 14, '95 75@ %
Machine 75@75&5%
Machine with C. & T. Nuts 70@5@ %

Door and Shutter—

Cast Iron Barrel, Round Brass Knob:

Inch	3	4	5	6	8
Per doz	$0.26	.30	.39	.47	.65

Cast Iron Spring Foot:

Inch	6	8	10
Per doz	$1.00	1.25	1.75

Cast Iron Chain, Flat, Japanned:

Inch	6	8	10
Per doz	$0.75	1.05	1.30

Cast Iron Shutter, Brass Knobs:

Inch	6	8	10
Per doz	$0.57	.80	1.00

Wrt Barrel, Jap'd. 75&10@75&10&10%
Wrought Bronzed. 40&5@50&10%
Wrought Flush, B. K.. 50&10@60&10%
Wrought Shutter 40&10&10@60&5%
Wrought Square Neck 50@50&10%
Wrought Sunk, Flush 50@50&10%
Ives' Patent Door 60%

Stove and Plow—

Plow 65&10@ %
Stove 30&5@30&10&5%

Tire—

Common 72½@72½&10%
Norway Iron 80@80&10%

American Screw Company:
Norway Phila., list Oct. 16, '84 80%
Eagle Phila. list Oct. 16, '84 82½%
Bay State, list Dec. 28, '99 72½%
Franklin Moore Co.:
Norway Phila., list Oct. 16, '84 80%
Eagle Phila., list Oct. 16, '84 82½%
Eclipse, list Dec. 28, '99 72½%
Russell, Burdsall & Ward Bolt & Nut Co.
Empire, list Dec. 28, '99 72½%
Norway Phila., list Oct. '84 80%
Upson Nut Co.:
Tire Bolts 72½%

Borers, Tap—

Borers Tap, Ring, with Handle:

Inch	1¼	1¼	1¾	2
Per doz	$4.30	5.00	5.75	7.25
Inch			2¼	2½
Per Doz			$8.65	11.50

Enterprise Mfg. Co., No. 1, $1.35; No. 2, $1.65; No. 3, $2.50 each 35%

Boxes, Mitre—

C. E. Jennings & Co. 25&10%
Langdon 15&10%
Perfection ₩ doz. $6.00
Schatz 40%

Braces—

NOTE.—*Most Braces are sold at net prices.*
Common Ball, American..$1.15@1.25
Barber's 50&10&10@60&10%
Fray's Genuine Spofford's 60%
Fray's No. 70 to 120, 81 to 133, 207 to 414 60%
C. E. Jennings & Co. 50&5&10%
Mayhew's Ratchet 60%
Mayhew's Quick Action Hay Patent. 50%
Millers Falls Drill Braces 25&10%
P., S. & W. Co. Peck's Patent 60&10@65%

Brackets—

Wrought Steel 80@ %
Bradley's Wire Shelf:
Full cases 80&10&10%
Broken cases 80&10%
Griffin's Pressed Steel 80%
Griffin's Folding Brackets 70&10%
Stowell's Cast Shelf 75%
Stowell's Sink 50%
Western, W. G. Co., Wire 60&10%

Bright Wire Goods—See *Wire and Wire Goods.*

Broilers—

Western, W. G. Co 80%
Wire Goods Co. 75@75&10%

Buckets, Well and Fire—

See *Pails.*

Bucks, Saw—

Hoosier ₩ gro. $36.00

Bull Rings—See *Rings, Bull.*

Butts—Brass—

Wrought list Sept., '96 20@30%
Cast Brass, Tiebout's 50%

Cast Iron—

Fast Joint, Broad 50@50&10%
Fast Joint, Narrow 50@50&10%
Loose Joint 70&5@70&10%
Loose Pin 70&5@70&10%
Mayer's Hinges 70&5@70&10%
Parliament Butts 70&5@70&10%

Wrought Steel—

Table and Back Flaps 75%
Narrow and Broad 75%
Inside Blind 75&10%
Loose Pin 75%
Loose Pin, Ball and Steeple Tip 80&20%
Japanned, Ball Tip Butts 70&10%
Bronzed Wrt. Nar. and Inside Blind Butts 55&10%

Extra 10@10&10%

Cages, Bird—

Hendryx, Brass:
3000, 5000, 1100 series 5%
1200 series 33⅓%
200, 300, 600 and 900 series 40&10%
Hendryx Bronze:
700, 800 series 40&10%
Hendryx Enameled 40&10%

Calipers—See *Compasses.*

Calks, Toe and Heel—

Blunt, 1 prong per lb. 4@4¼c
Sharp, 1 prong per lb. 4¼@4¾c
Perkins' Blunt Toe cents, ₩ lb .35
Perkins' Sharp Toe cents, ₩ lb .415

Can Openers—See *Openers, Can*

Cans, Milk—

	5	8	10 gal.	
Illinois Pattern.	$1 50	2.00	2.25	each.
Iowa Pattern	....	2.35	2.50	each.
	20	30	40	qts.
New York Patt'rn	1.65	2.40	2.75	each.
Baltimore Patt'rn	....	1.80	2.00	each.

Cans, Oil—

Buffalo Family Oil Cans:

3	5	10 gal.	
$48.00	64.20	129.60	gro., net

Caps—Percussion—

Eley's E. B. *80c*
G. D .....*per M 34@35c*
E. L. .....*per M 40@45c*
G. E. .....*per M 50@57c*
Musket .....*per M 62@63c*

Primers—

Berdan Primers, $2.00 per M...20c&5%
B. L Caps (Sturtevant Shells) $2.00 per M 20%
All other primers per M. $1.52@$1.60

Cartridges—

Blank Cartridges:
22 C. F., $5.50.....10c&5%
38 C. F., $7.00.....10c&5%
22 cal. Rim, $1.50.....10c&5%
32 cal. Rim, $2.75.....10c&5%
B. B. Caps, Con., Ball Swgd.....$1.90
B. B. Caps, Round Ball.....$1.49
Central Fire 25%
Target and Sporting Rifle.....15c&5%
Primed Shells and Bullets.....15c&10%
Rim Fire Sporting.....50%
Rim Fire, Military.....15c&5%

Cases, Show—

Sun, No. 102. Silent Salesman, 6 ft., $35.00

Casters—

Bed..... .....70@70c&10%
Plate .....60c&5@60c&10%
Philadelphia.. .....75@75c&5%
Boss.....70c&10%
Boss Anti-Friction.....50&10%
Gem (Roller Bearing).....75&5%
Martin's Patent (Phœnix).....45%
Smith & Hemenway Co.....33⅓&5%
Standard Ball Bearing.....45%
Tucker's Patent low list.....30%
Yale (Double Wheel) low list.....45%

Cattle Leaders—

See *Leaders, Cattle.*

Chain, Coil—

American Coil, Jobbers' Shipments:

3-16	¼	5-16	⅜	7-16	½	9-16
8.00	5.30	4.15	3.75	3.60	3.50	3.45
⅝	¾	⅞	1 to 1¼ inch.			
3.30	3.25	3.50	3.15	per 100 lb.		

German Coil .....60c&10@10%

Halters and Ties—

Halter Chains.....60c&10@60c&10c&10%
German Pattern Halter Chains, list July 24, '97.....60c&10c&10@.....%
Cow Ties..... .....60@60c&10%

Trace, Wagon, &c.—

Traces, Western Standard: 100 pair
6½—6-3, Straight, with ring...$35.50
6½—6-2, Straight, with ring...$24.50
6½—8-2, Straight, with ring..$38.00
6½—10-2, Straight, with ring..$52.00
Add 2¢ per pair for Hooks.
Twist Traces 2¢ per pair higher than Straight Link.
Trace, Wagon and Fancy Chains..
.....60&5@60c&10c&5%

Miscellaneous—

Jack Chain, list July 10, '93:
Iron.....60c&10@60c&10c&5%
Brass.....60c&10@60c&10c&10%
Safety Chain.....75@75&10c&5%
Gal. Pump Chain.....*lb* 4¼@4¼c
Covert Mfg. Co.
Breast.....40&2½
Halter.....40&2½
Heel.....40&2½
Rein.....40&2½
Stallion.....40&2½
Covert Sad. Works:
Breast.....70%
Halter.....70%
Hold Back.....70%
Rein.....70%
Oneida Community:
Am. Coil and Halters.....40@40&5%
Am. Cow Ties.....45&50&5%
Eureka Coil and Halter.....45@50&5%
Niagara Coil and Halter.....45&50&5%
Niagara Cow Ties.....45&50&10&5%
Niagara Wire Dog Chains...45&50&5%
Wire Goods Co.:
Dog Chain.....70&10%
Universal Dbl-Jointed Chain.....50%

Chalk—(From Jobbers.)

Carpenters' Blue.....*gro.* 40c
Carpenters', Red .....*gro.* 35c
Carpenters', White.....*gro.* 30c
See also Crayons.

Checks, Door—

Bardsley's.....45%
Columbia.....50&10%
Eclipse.....60&10%

Chests, Tool—

American Tool Chest Co.:
Boys' Chests, with Tools.....55%
Youths' Chests, with Tools.....40%
Gentlemens' Chests, with Tools.....30%
Farmers', Carpenters', etc., Chests, with Tools.....20%
Machinists' and Pipe Fitters' Chests, Empty.....50%
C. E. Jennings & Co.'s Machinists' Tool Chests.....33⅓&10%

Chisels—

Socket Framing and Firmer
Standard List.....70@70c&10%
Buck Bros.....30%
Charles Buck.....30%
C. E. Jennings & Co. Socket Firmer No. 10.....60&10%
C. E. Jennings & Co. Socket Framing No. 15.....60&10%
Ohio Tool Co.'s 70%
Swan's.....70%
L. & I. J. White.....30@30&5%

Tanged—

Tanged Firmers.....40c&5@40&10%
Buck Bros.....30%
Charles Buck.....30%
C. E. Jennings & Co. Nos. 191, 181.....
.....16⅔&10%
L. & I. J. White, Tanged.....35&5%

Cold—

Cold Chisels, good quality..lb. 13@15c
Cold Chisels, fair quality..lb. 11@12c
Cold Chisels, ordinary.....*lb. 9 @10c*

Chucks—

Beach Pat., each $8.00.. .....35&5%
Pratt's Positive Drive.....25%
Empire.....25%
Blacksmiths'.....25%
Skinner Patent Chucks:
Independent Lathe Chucks.....50%
Universal 50%
Combination 50%
Drill Chucks, New Model 30%
Drill Chucks, Standard 40%
Drill Chucks, Skinner Patent, 0, 1, 2 .40%
Drill Chucks, Skinner Patent, 3, 4, 5, 6, 7, 8.....30%
Drill Chucks, Positive Drive.....30%
Planer Chucks.....25%
Face Plate Jaws.....40%
Standard Tool Co.:
Improved Drill Chuck.....45%
Union Mfg. Co.:
Combination.....50%
Czar Drill 35%
Combination Geared Scroll.....40%
Geared Scroll 40%
Independent.....50%
Independent Steel.....40%
Union Drill.....45%
Universal.....50%
Independent Iron Face Plate Jaws..40%
Independent Steel Face Plate Jaws..40%
Westcott Patent Chucks:
Lathe Chucks.....50%
Little Giant Auxiliary Drill.....45%
Little Giant Double Grip Drill.....45%
Little Giant Drill, Improved 45%
Oneida Drill.....45%
Scroll Combination Lathe.....45%

Clamps—

Adjustable, Hammers'.....30@20&5%
Cabinet, Sargent's.....50&10%
Carriage Makers', P., S. & W. Co......50%
Carriage Makers' Sargent's.....60%
Beaty, Parallel.....33⅓&10%
Linemans' Utica Drop Forge & Tool Co40%
Saw Clamps, see *Vises, Saw Filers'.*

Cleaners, Drain—

Iwan's Champion, Adjustable.....55%
Iwan's Champion, Stationary.....40%

Sidewalk—

Star Socket, All Steel....₩ doz. $4.05 net
Star Shank, All Steel....₩ doz. $3.24 net
W. & C. Shank, All steel, ₩ doz., 7½ in., $3.00; 8 in., $3.25.

Cleavers, Butchers'—

Foster Bros......30%
New Haven Edge Tool Co.'s.....45%
Fayette R. Plumb.....33⅓@33⅓&10%
L. & I. J. White.....30%

Clippers—

Chicago Flexible Shaft Company:
'98 Chicago Horse.....$8.75 } 15%
1902 Chicago Horse.....$10.75 }
20th Century Horse, each, $5.00 .....20%
Lightning Belt.....$15.00 } 15%
Chicago Belt.....$20.00 }
Stewart's Patent Sheep.....$18.50 }

Finger Nail Clippers—

Smith & Hemenway Co..... doz. net $2.00

Clips, Axle—

Eagle 5-16 and ⅜ inch....75@75c&10%
Norway, 5-16 and ⅜ inch..60c&10@70%

Cloth and Netting, Wire
—See *Wire, &c.*

Cocks, Brass—

Hardware list:
Compression, Plain Bibbs, Globe, Kerosene, Racking, &c., Cocks.
.....70c&10@75%

Coffee Mills—See *Mills, Coffee.*

Collars, Dog—

Brass, Walter B. Stevens & Son's list.40%
Embossed, Gilt, Walter B. Stevens & Son's list.....30&10%
Leather, Walter B. Stevens & Son's list 40%

Combs, Curry—

Metal Stamping Co.....30&10%

Mane and Tail—

Covert's Saddlery Works.....60&10%

Compasses, Dividers, &c.

Ordinary Goods.....75c&5@75c&10%
Bemis & Call Hdw. & Tool Co.:
Dividers.....65%
Calipers, Double.....65%
Calipers, Inside or Outside.....65%
Calipers, Wing.....60%
Compasses.....50%

Compressors, Corn hock—

J. B. Hughes' ₩ doz.....$2.50

Conductor Pipe, Galva —

L. C. L. to Dealers:

Territory.	*Nested.*	*Not nested.*
A. Eastern.	75c&7½%	75c&2½%
B. Eastern	75c&10c&2½%	75c&7½%
Central.....	75c&7½%	75&
Southern ..	70c&10%	70c&5%
S. Western..	70c&7½%	70c&2½%

Terms, 60 days, 2% cash, 10 days. Factory shipments generally delivered.
See also *Eave Troughs.*

Coolers, Water—

Gal. each.	2	3	4	6	8
Labrador	$1.20	$1.50	$1.80	$2.10	2.70
Gal.	3	4	6	8	
Iceland, ea.	$1.80	$2.10	2.40	$3.00	
Gal....	2	3	4	6	8
Galv. Lined Ea.	$1.85	$2.00	$2.2	$2.90	$3.90

25%

Ga.v. Lined side handles.

Gal.	2	3	4	6	8
Each.	$1.95	$2.15	$2.40	$3.30	$4.15..25%

Coopers' Tools—

See *Tools, Coopers'.*

Cord—Sash—

Braided, Drab.....*lb. 35c*
Braided, White, Com..... *lb. 25@25c*
Cable, Laid Italian..lb. A, 18c; B, 16c
Common India.....*lb. 10@10½c*
Cotton Sash Cord, Twisted....20@25c
Fatent Russia.....*lb.* ..@15c
Cable Laid Russia.....*lb.* ..@15c
India Hemp, Braided.....*lb* ..@18c
India Hemp, Twisted.....*lb. 12@15c*
Patent India, Twisted.....*lb.13@13c*

Anniston Cordage Co.: Braided Cotton.
Old Glory, Nos. 7 to 12.....₩ lb 30 ¢
Anniston, Nos. 7 to 12.....₩ lb 25 ¢
Old Colony, Nos 7 to 12.....₩ lb 25 ¢
Anniston Drab, Nos. 7 to 12...₩ lb 30 ¢
Pearl Braided, cotton, No. 6₩ lb, 24¢; Nos. 7 to 12 2 ¢
Eddystone Braided Cotton, No. 6 ₩ lb 27¢
Harmony Cable Laid Italian, No. 7 to 10 ... ₩ lb 33¢
Peerless:
Cable Laid Italian.....16¢
Cable Laid Russian.....14¢
Cable Laid India.....12¢
Braided India.....18¢
Samson, Nos. 7 to 12:
Braided, Drab Cotton.....₩ lb 36½¢
Braided, Italian Hemp.....₩ lb 36¢
Braided, Linen.....₩ lb 54¢
Braided, White Cotton or Spot, ₩ lb 48¢
Massachusetts, White.....₩ lb 28 ¢
Massachusetts, Drab.....₩ lb 32 ¢
Phœnix, White, No's 7 to 12.....24¢
No. 6 cords, 1¢ extra.
Silver Lake:
A quality, Drab.....40¢
A quality, White.....35¢
B quality, Drab.....35¢
B quality, White.....30¢
Italian Hemp.....40¢
Linen.....57½¢

Wire, Picture—

List Oct., '00.....85c&10@85c&10c&10c&5%

Cradles—

Grain.....40c&12½%

Crayons—

White Round Crayons, gross.5½@6c
Cases, 100 gro., $4.00, at factory.
D. M. Steward Mfg. Co.
Jumbo Crayons.....gr. $3.50
Metal Workers' Crayons.gr. $2.50
Soapstone Pencils, round, flat or square.....gr.$1.50 } Case lots 20%
Rolling Mill Crayons.....gr. $2.50
Railroad Crayons (composition) gr. $2.00
Zelnicker's Lumber:
Red, Blue, Green .....₩ gro. $6.50
Black.....₩ gro. $4.00
See also *Chalk.*

Crooks, Shepherds'—

Fort Madison, Heavy.....₩ doz. $7.00
Fort Madison, Light.....₩ doz. $6.50

Crow Bars—See *Bars, Crow.*

Cultivators—

Victor Garden 50%

Cutlery, Table—

International Silver Company:
No. 12 Medium Knives, 1847..₩ doz. $3.50
Star, Eagle, Rogers & Hamilton and Anchor.....₩ doz. $3.00
Wm. Rogers & Son.....₩ doz. $2 50
Simeon L. & Geo. H. Rogers Company:
12 dwt. Medium Knives.....₩doz. $3.00
No. 77 Medium Knives.....₩ doz. $2.50

Cutters—Glass—

H. H. Mayhew Co.....40%
Red Devil.....50%
Smith & Hemenway Co.....50%
Woodward.....40%

Meat and Food—

American.....30%
Nos..... 1 2 3 4 B 5
Each.....$5 $7 $10 $25 $50 $60
Enterprise.....25@25&7½%
Nos..... 5 10 12 22 32
Each..... $2 $3 $3.75 $4.50 $6
Dixon's, ₩ doz.....30&10@40%
Nos.. 1 2 3 4
$14.00 $17.00 $19.00 $30.00
Ideal .....40&10@60%
Little Giant, ₩ doz.....33⅓@e 10%
Nos. 3(5 310 312 320 322
$35.00 $48.00 $44.00 $71.00 $68.00
N. E. Food Choppers.....40%
New Triumph No. 605, ₩ doz. $24.00..
30&10&10%
Russwin Food No. 1, $24 00; No. 2, $27.00
45&10&10%
Sterling.....40@10&1 %
No 1....$2.00 each No. 2. $2.50 each
Woodruff's, ₩ doz .....30&10@40%
Nos..... 100 150
$15.00 $18.00
Enterprise Beef Shavers.....25@30%

Slaw and Kraut—

Henry Disston & Sons:
Slaw, Corn Grater, &c 40%
Kraut Cutters 24 x 7, 26 x 8, 30 x 9.55%
Kraut Cutters 36 x 12, 40 x 12.....40%
J. M. Mast Mfg. Co.:
Slaw Cutters, 1 Knife.....₩ doz. $3.00
Combined Slaw Cutter and Corn Grater.....₩ doz. $4.00
Sterling, $6.00 each.....33⅓&
Tucker & Dorsey Mfg. Co.:
Kraut Cutters.....40%
Slaw Cutters, 1 Knife, ₩ gr....$18@$20
Slaw Cutters, 2 Knife, ₩ gr....$22@$36

Tobacco—

All Iron, Cheap.....*doz. $4.25@$4.50*
Enterprise.....25@50%
National, ₩ doz. No. 1, $21; No. 2, $18..40%
Sargent's, ₩ doz., No. 2.....60%
Sargent's No 12 and 21 .....60&10%

Washer—

Appleton's, ₩ doz. $16.00....50&10&10%
Bonney's.....33⅓&

Diggers, Post Hole, &c.—

Dalbey Post Hole Auger...per doz., $9.00
Iwan's Improved Post Hole Auger.40&5%
Iwan's Vaughan Pattern Post Hole Augers, ₩ doz.....$6.50
Iwan's Perfection Post Hole Digger.. ₩ doz. $8.50
Iwan's Split Handle Post Hole Diggers, ₩ doz.....$7.50
Kohler's Universal..... ₩ doz. $15.00
Kohler's Little Giant.....₩ doz. $12.60
Kohler's Hercules.....₩ doz. $10.00
Kohler's Invincible.....₩ doz. $9 60
Kohler's Rival.....₩ doz. $8.50
Kohler's Pioneer.....₩ doz. $7.50
Never-Break Post Hole Diggers, ₩ doz. $24.00.....60%
Samson, ₩ doz. $34.00.....25%

Dividers—See *Compasses.*

Doors Screen—

Phillips', style E, ¾ in.....₩ doz, $10.50
Phillips', style 077, ¾ in. .....₩ doz, $8.00
Phillips', style x-y, ¾ in.....₩ doz, $11.00
Porter's Plain, No. 6.....₩ doz. $6 75
Porter's Ornamental, No. 70. ₩ doz. $10.50
Porter's No. 99.....$9.00
Porter's No. 44.....$10.75

Drawers, Money—

Sun Money Drawers, No. 5, ₩ doz. $9.50; No. 6, with Bell, $10.00; No. 6, with Gong, $10.50.
Tucker's Pat. Alarm Till No. 1, ₩ doz. $18; No. 2, $15; No. 3, $13; No. 4, $18

Drawing Knives—

See *Knives, Drawing.*

Drills and Drill Stocks—

Common Blacksmiths' Drill..each $1.50@$1.75
Breast, Millers Falls.....15&10%
Breast, P., S. & W .....40&5%
Goodell Automatic Drills..40&5@40&10%
Johnson's Automatic Drills Nos. 2 and 3.....16⅔&10%
Johnson's Drill Points.....16⅔&5&10%
Millers Falls Automatic Drills...33⅓&10%
Ratchet, Curtis & Curtis 25%
Ratchet, Parker's 40%
Ratchet, Weston's.....33⅓&
Ratchet, Whitney's, P. S. & W.....50%
Whitney's Hand Drill, No. 1, $10.00; Adjustable, No. 10, $12.00.....33⅓&

Twist Drills—

Bit Stock.....6¢&10@60c&10c&10%
Taper and Straight Shank .....
60c&10@60c&10c&5%

Drivers, Screw—

Screw Driver Bits..per doz. ..45@75c
Halsey's Screw Holder and Driver, ₩ doz. 2¼-inch, $6; 4-in., $7.50 6-in., $9...40%
Buck Bros' Screw Driver Bits.....30%
Champion.....50%
Edson.....60%
Fray's Hol. H'dle Sets, No. 3, $12.00 50%
Gay's Double Action Ratchet.....35%
Goodell's Auto50&10&10@50&10&10&5%
Hurwood.....40%
Mayhew's Black Handle.....40%
Mayhew's Monarch.....40&10%
Millers Falls, Nos. 20 and 21 .....25&10%
Millers Falls, Nos. 11, 12, 41 42.....15&10%
Never Turn.....60%
New England Specialty Co.....50%
Sargent & Co.'s:
Nos. 1 and 60.....50&10&10%
Nos. 30 and 35.....60&10%
Nos. 20 and 40.....70&10%
Smith & Hemenway Co .....40&5%
H. D. Smith & Co.'s, Perfect Handle...40%
Stanley's R. & L. Co.'s:
No. 64, Varnished Handles.....60&10&10%
No. 80.....70@70&10&10%
Swan's:
Nos. 65 to 68.....50%
No. 40.....40&10%
Nos. 25, 35 and 45.....20&10&10%

Eave Trough, Galvanized

Territory.	*L. C. L.*
A. Eastern.....	*80c&10%*
B. Eastern.....	*80c&10c&5%*
Central.....	*80c&10%*
Southern.....	*75c&16⅔%*
S. Western..	*75c&10c&5%*

Terms, 2% for cash. Factory shipments generally delivered.
See also *Conductor Pipe and Elbows.*

Elbows and Shoes—

Factory shipments.....60%
Perfect Elbows (S. S. & Co.)..... .....30%

Emery, Turkish—

	4 to 46	*5 4 to 150*	*Flour*
Kegs.....*lb.*	*5c*	*5½c*	*3½c*
½ Kegs ..... *lb.*	*5½c*	*5¾c*	*5¾c*
Kegs.....*lb*	*5c*	*6c*	
10-lb cans. 10 in case	*6½c*	*7c*	*6c*
10-lb. cans, less than	*10c*	*10c*	*8c*

NOTE.—*In lots 1 to 3 tons a discount of 10% is given.*

Extractors, Lemon Juice
—See *Squeezers, Lemon.*

Fasteners, Blind—

Zimmerman's .....50&10%
Walling's.....50%

Cord and Weight—

Ives 40%

Faucets—

Cork Lined.....50@50c&10%
*Metallic K-g, Leather Lined*70@70c&10%
Red Cedar.....40@40c&10%
Petroleum.....70c&10@75%
B. & L. B. Co.:
Metal Key.....60&10%
Star.....60%
West Lock.....50&10%
John Sommer's Peerless Tin Key.... 40%
John Sommer's Boss Tin Key.....50%
John Sommer's Victor Metal Key.50&10%
John Sommer's Duplex Metal Key....60%
John Sommer's Diamond Lock.....40%
John Sommer's I. X. L. Cork Lined...50%
John Sommer's Reliable Cork Lined 50&10%
John Sommer's Chicago Cork Lined..60%
John Sommer's O. K. Cork Lined.....50%
John Sommer's No Brand, Cedar.....50%
John Sommer's Perfection Cedar....40%
McKenna, Brass:
Burglar Proof, N. P.....35%
Improved, ¼ and ⅜ inch.....33⅓
Self Measuring:
Enterprise, ₩ doz. $36.00..... 40&10%
Lane's, ₩ doz. $36.00 .....40&10%
National Measuring, ₩ doz. $36..40&10%

Felloe Plates—

See *Plates, Felloe.*

Files—Domestic—

List revised Nov. 1, 1899.
Best Brands.....70c&5@70c&10c&5%
Standard Brands..75c&5@75c&10c&10%
Second Quality.....75c&10c&10@80c&5%

Imported—

Stubs' Tapers, Stubs' list, July 24, '97.....30%

Fixtures, Grindstone—

Net Prices:

Inch....	*15*	*17*	*19*	*21*	*24*
Per doz.	*$2.15*	*2.85*	*3.25*	*3.75*	*4.50*

P., S. & W. Co.....30&10&10%
Reading Hardware Co.....60%
Sargent's.....60&10&10%
Stowell's Giant Grindstone Hanger..... ₩ doz. $6.00
Stowell's Grindstone Fixtures, Extra Heavy.....50&10&10%
Stowell's Grindstone Fixtures Light... 60&10%

Fodder Squeezers—

See *Compressors.*

Forks—

Base Discounts Aug. 1, 1899, list:
Hay, 2 tine.....50&10c&5%
Boys' & Fish, 2 tine.....50&10c&5%
Hay & Boys', 3 tine.....60c&5%
Hay & Boys', 4 tine.....66⅔%
Champion Hay.....66⅔%
Hay & Header, long 3 tine.....65%
Header, 4 tine.....65%
Barley, 4 & 5 tine, Steel.....60&20%
Manure, 4 tine.....60&15&2½%
Manure, 5 and 6 tine.....66⅔&2½%
Spading.....70&2½%
Potato Digger, 6 tine.....60&10%
Sugar Beet.....40&10%
Coke & Coal.....40&10%
Heavy Mill & Street.....65%
Iowa Dig-Easy Potato.....60&10%
Victor, Hay.....60&15&2½%
Victor, Manure.....66⅔%
Victor, Header.....65%
Champion, Hay.....66⅔%
Champion Header.....65%
Champion, Manure.....60&15&2½%
Columbia, Hay.....60&20%
Columbia, Manure.....70%
Columbia, Spading.....70&12½%
Hawkeye Wood Barley.....40%
W. & C. Potato Digger.....60&12½%
Acme Hay.....60&10&5%
Acme Manure, 4 tine.....60&20&7½%
Dakota Header.....65&15&5%
Jackson Steel Barley.....65&15&5%
Kansas Header.....66⅔%
W. & C. Favorite Wood Barley.....40%
Plated.—See *Spoons*.

Fountains, Stock—

Double Dewey.....₱ doz. $13.00

Frames— Saw—

White, Straight Bar, per doz. 75@80c
Red, Straight Bar, per doz. $1.00@$1.25
Red, Double Brace, per doz. $1.40@1.50

Freezers Ice Cream—

Qt.	*1*	*2*	*3*	*4*	*6*
Each	*$1.25*	*$1.60*	*$1.90*	*$2.20*	*$2 80*

Fruit and Jelly Presses—

See *Presses, Fruit and Jelly.*

Fry Pans—See *Pans, Fry.*

Fuse— *Per 1000 Feet.*

Hemp.....*$2.75*
Cotton.....*3.90*
Waterproof Single Taped..*3.65*
Waterproof Double Taped..*4.40*
Waterproof Triple Taped..*5.15*
10&2½%

Gates, Molasses and Oil—

Stebbins' Pattern...80&10@80&10c&5%

Gauges—

Marking, Mortise, &c......
50&10c&5@50&10c&10c&5%
Chapin-Stephens Co.:
Marking, Mortise, etc.50&10@50&10&10%
Scholl's Patent.....50&10@50&10&10%
Door Hangers.....5@50&10%
Fuston's Butt Gauge.....30&10%
Stanley R. & L. Co.'s Butt & Rabbet Gauge.....20@20&10&10%
Wire, Brown & Sharpe's.....25%
Wire, Morse's.....25%
Wire P., S. & W. Co.....30&10%

Gimlets— Single Cut—

Nail, Metal, Assorted, gro. $1.40@1.80
Spike, Metal, Assorted gro. $2.80@3.50
Nail, Wood Handled, Assorted, gro. $1.75@2.00
Spike, Wood Handled, Assorted gro. $1.25@1.50

Glass, American Window

See *Trade Report.*

Glasses, Level—

Chapin-Stephens Co.....60@60&10&10%

Glue—Liquid Fish—

Bottles or Cans, with Brush...25@50%
Cans (½ pts., pts., qts., ½ gal., gal.).....25@48%
International Glue Co. (Martin's).....
40&10@50%

Grease Axle—

Common Grade.....*gro. $4.50@5.50*
Dixon's Everlasting....10-lb pails, ea. 85¢
Dixon's Everlasting, in bxs...₱ doz. 1 lb $1.20; 2 lb $2.00

Grips, Nipple—

Perfect Nipple Grips.....40&10&2%

Griddles, Soapstone—

Pike Mfg. Co.....33⅓@33⅓&10%

Grindstones—

Bicycle Emery Grinder.....$6.50
Bicycle Grindstones, each.....$2.50@3.00
Pike Mfg. Co:
Improved Family Grindstones, per inch, per doz.....$2.00 } 33⅓%
Pike Mowe Knife and Tool Grinder, each.....$6.00 }
Velox Ball Bearing, mounted, Angle Iron Frames.....each, $3.25

Halters and Ties—

Covert Mfg. Co.:
Web.....45&2%
Jute Rope.....40&5&5%
Sisal Rope.....20&2%
Covert's Saddlery Works:
Web and Leather Halters.....70%
Jute and Manila Rope Halters.....70%
Sisal Rope Halters.....60&20%
Jute, Manila and Cotton Rope Ties..70%
Sisal Rope Ties.....60&10%

Hammers—

Handled Hammers—

Heller's Machinists'..40&10@40&10&10%
Heller's Farriers.....40&10@40&10&10%
Magnetic Tack, Nos. 1, 2, 3, $1.25, $1.50, $1.75.....40@40&10&10%
Peck, Stow & Wilcox.....40&10&5%
Fayette R. Plumb:
Plumb, A. E. Nail.33½&7½@33½&10&7½%
Engineers' and B. S. Hand.....
50&7½&5@50&10&7½&5%
Machinists' Hammers50&5@50&10&5%
Riveting and Tinners'.....
40&3½@40&10&2½%
Sargent's C. S. New List.....40%

Heavy Hammers and Sledges—

Under 3 lb.....lb 50c } 75¢10&5
3 to 5 lb.....lb 40c } @5%
Over 5 lb.....lb. 30c }
Wilkinson's Smiths'.....9½c@10c lb.

Handles—

Agricultural Tool Handles—

Axe, Pick, &c......4 @50&5%
Hoe, Rake, &c......45@50&5%
Fork, Shovel, Spade, &c.:
Long Handles.....45@50&5%
D Handles.....40%

Cross-Cut Saw Handles—

Atkins'.....40&5%
Champion.....45@45&10%
Disston's.....50%

Mechanics' Tool Handle.75

Auger, assorted.....*gro. $2.50@$2 85*
Brad Awl.....*gro. $1.65@$1 85*
Chisel Handles:
Apple Tanged Firmer, gro. ass'd. $2.10@$2.65
Hickory Tanged Firmer, gro. ass'd. $2 15@$2.40
Apple Socket Firmer, gro. ass'd, $1 75@$1.95
Hickory Socket Firmer, gro ass'd. $1.45 @ $1.60
Hickory Socket Framing, gro. ass'd. $1.60@$1.75
File, assorted.....*gro. $1.30@$1.40*
Hammer, Hatchet, Axe, &c......50%
Hand Saw, Varnished, doz .80@85c
Not Varnished.....65@75c
Plane Handles:
Jack, doz. 30c; Jack Bolted.....75c
Fore, doz......45c; *Fore, Bolted*..
90c
Chapin-Stephens Co.:
Carving Tool.....40@40&10%
Chisel.....65@65&10%
File and Awl.....65@65&10%
Saw and Plane.....40@40&10%
Screw Driver.....40@40&10%
Millers Falls Adj. and Ratchet Auger Handles.....15&10%
Nicholson Simplicity File Handle, ₱ gro.....$0.85@$1.50

Hangers—

NOTE.—*Barn Door Hangers are generally quoted per pair, without track, and Parlor Door Hangers per double set with track, &c.*

Barn Door, New Pattern, Round Groove, Regular:

Inch	*3*	*4*	*5*	*6*	*8*
Single Doz.	*$0.90*	*1.25*	*1.60*	*1.95*	*2.50*

Barn Door, New England Pattern, Check Back, Regular:

Inch	*3*	*4*	*5*	*6*
Single Doz.	*$1.30*	*1.85*	*2.50*	*3.00*

Allith Mfg. Co.
Reliable No. 1.....per doz. $12.00
Reliable No. 2.....per doz. $15.00
Chicago Spring Butt Co.:
Friction.....25%
Oscillating.....25%
Big Twin.....25%
Chisholm & Moore Mfg. Co.:
Baggage Car Door.....50%
Elevator.....30%
Railroad.....50%
Cronk & Carrier Mfg. Co.:
Loose Axle.....60%
Roller Bearing.....60&10%
Lane Bros. Co.:
Parlor, Ball Bearing.....$4.15
Parlor, Standard.....$3.35
Parlor, New Model.....$2.85
Parlor New Champion.....$2.25
Barn Door, Standard, 50&10&10&5%
Hinged.....$6.40
Covered.....50&10&10%
Special.....50&10&10&5%
Lawrence Bros.:
Advance.....60%
Cleveland.....60&10%
Crown.....60%
Giant.....50&10%
New York.....60%
Peerless.....60&10%
Sterling.....60%
Swing, No. 05.....60%
Union, No. 44, $5.00; No. 45 $7.00; No. 46, $9.00.....
McKinney Mfg. Co.:
No. 1, Special, $15.....60&10%
No. 2, Standard, $18.....60&10%
Hinged Hangers, $16.....50%
Meyers' Stayon Hangers.....60%
C. S. Smith Mfg. Co.:
Lundy Parlor Door.....50&10%
Monarch Barn Door.....60&10%
Never Jump Hinge.....50&10%
Peerless.....60&10%
Perfection.....70&5%
Phoenix.....70&5%
Wagner's Adjustable.....70&10%
Warehouse Anti-Friction.....60%
Richards Mfg. Co.:
Pioneer Wood Track No. 3.....$2.25
Imp'd Wood Track No. 5.....$2.25
Imp'd Steel Track No. 7.....$2.70
Imp'd Steel Track No. 7.....$2.65
Ball B'r'g Steel Track No. 9.....$2.50
Ball B'r'g Steel Track No. 10.....$2.50
Roller B'r'g Steel Track No. 11.....$2.45
Roller B'r'g Steel Track No. 12.....$2.40
Ball B'r'g Steel Track No. 13..$2.75
Roller B'r'g Steel Track No. 14..$2.65
Ball B'r'g Trolley Track No. 15 ..40%
Ball Brg Trolley Track No. 19..40&5%
Ball Bearing Tandem Trolley Track No. 16.....40%
Silent Adjustable Track No. 18...40%
Auto Adjustable Track No. 22...40%
Trolley B. D. No. 17.....$1.60
Trolley F. D. No. 120.....$2.70
Trolley F. D. No. 121.....$2.85
Trolley F. D. No. 151.....$3.00
Roller Bearing D. D. No. 25.....70&5
Roller Bearing U. S. B. D.....70&5%
Anti Friction B. D.....60&10%
Ives' Wood Track No. 1.....$2.15
Ives' Imp'd Wood Track No. 2..$2.15
Safety Door Hanger Co.:
Storm King Saftey.....60%
U. S. Standard Hinge.....60%
Stowell Mfg. and Foundry Co.:
Acme Parlor Ball Bearing.....40%
Ajax Hinge Door.....60%
Apex Parlor Door.....50&10&5%
Atlas.....60%
Extra 5&10% often given.

Baggage Car Door.....50%
Climax Anti-Friction.....50&10%
Elevator.....40%
Express.....50%
Freight Car Door.....60%
Interstate.....40&10%
Lundy Parlor Door..50&10%
Magic.....60%
Matchless.....60&10%
Nansen.....70&5%
Parlor Door.....55&10%
Railroad.....50&10%
Rex Hinge Door.....60%
Street Car Door.....50%
Steel, Nos. 300, 404, 500.....50&10%
Underwriter's Fire Door.....40%
Wild West Warehouse Door.....50%
Zenith for Wood Track.....50&10%
A. L. Swett Iron Works:
Eagle.....60&10%
Hylo.....50&10%
Perfection.....60%
Pilot.....40%
Taylor & Boggis F'y Co.'s Kidder's Roller Bearing.....50&15&10&5%
Wilcox Mfg. Co.:
Bike Roller Bearing.....60&10%
C. J. Roller Bearing.....60&10%
Cycle Ball Bearing.....50%
Dwarf Ball Bearing.....40%
Ives, Wood Track.....60&10%
L. T. Roller Bearing.....60&10&5%
New Era Roller Bearing.....50&10%
O. K. Roller Bearing.....60&10&5%
Prindle, Wood Track.....60%
Richards' Wood Track.....60%
Richards' Steel Track.....50&10%
Spencer Roller Bearing.....60&10%
Tandem Nos. 1 and 2.....60%
Underwriters' Roller Bearing....40%
Velvet.....50%
Wilcox Auditorium Ball Bearing.20%
Wilcox Barn Trolley No. 123. ....40%
Wilcox Elv. Door, Nos 112 and 122½.50%
Wilcox Elv. Door, No. 132.....40%
Wilcox Fire Trolley, Roller Bearing.....30%
Wilcox Le Roy Noiseless Ball Bearing.....40%
Wilcox New Century.....50&10&10%
Wilcox O. K. Steel Track.....50%
Wilcox O. K. Trolley.....50%
Wilcox Trolley Ball Bearing.....40%
Wilcox Wideman Narrow Gauge, Ball Bearing.....40%
For Track, see *Rail*
Extra 5&10% often given.

Hangers, Garment—

Western, W. G. Co.....70&10%

Gate—

Myers' Patent Gate Hangers, ₱ doz net 4.50

Hasps—

McKinney's Perfect Hasp, ₱ doz.....50%

Hatchets—

Regular list.....40@40&5%

Heaters, Carriage—

Clark, No. 3, $2.25; No. 3D, $2.75; No 3z, $4.25; No. 1, $3.50 each.....15%
Clark Coal, $0.75 ₱ doz.....10%

Hinges—

Blind and Shutter Hinges—

Surface Gravity Locking Blind:
(Victor; National; 1868 O. P. Niagara; Clark's O. P.; Clark's Tip; Buffalo.)

No.	*1*	*3*	*5*
Doz. pair	*$0.85*	*1.75*	*3.50*

Mortise Shutter:
(L. & P., O. S., Dixie, &c.)

No.	*1*	*1½*	*2*	*2½*
Doz. pair	*$0.70*	*.65*	*.60*	*.55*

Mortise Reversible Shutter, (Buffalo, &c.)

No.	*1*	*1½*	*2*
Doz. pair	*$0.75*	*.70*	*.65*

North's Automatic Blind Fixtures, No. 2, for Wood, $9.00; No. 3, for Brick, $11.50.....10%
Parker.....70@75%
Reading's Gravity.....50&5%
Sargent's, Nos. 1, 3, 5, 11 & 13.....
70&10@75%
Stanley's Steel Gravity Blind Hinges, ₱ doz. sets, without screws, $0.80; with screws, $1.15.
Wrightsville H'dware Co.:
O. S., Lull & Porter.....7 &5%
Acme, Lull & Porter.....75%
Queen City Reversible.....75%
Stenger's Positive Locking, Nos. 1 & 3.....70&10%
Shepard's Noiseless, Nos. 60, 65, 55....
70&10%
Niagara, Gravity Locking, Nos 1, 3 & 5.....75%
1868, Old Pat'n, Nos. 1, 3 & 5.....75%
Tip Pat'n, Nos. 1, 3 & 5.....5%
Buffalo Gravity Locking, Nos. 1, 3 & 5.....75%
Shepard's Double Locking, Nos. 20 & 25.....70%
Champion Gravity Locking, No. 75..75%
Steamboat Gravity Locking, No. 10.75%
Pioneer, Nos. 060, 45 & 55.....75%
Empire, Nos. 101 & 103.....70%
W. H. Co.'s Mortise Gravity Locking, No. 2.....60%
Whipple's Patent Automatic.....30%

Gate Hinges—

Clark's or Shepard's—Doz. sets:

No.	*1*	*2*	*3*
Hinges with Latches	*$2.00*	*2.70*	*5.00*
Hinges only	*$1.40*	*2.05*	*3.80*
Latches only	*.70*	*.70*	*.35*

New England:
With Latch.....*doz* ....*@$2.00*
Without Latch....*doz.* ....*@$1.60*
Reversible Self-Closing:
With Latch.....*doz.* ....*@$1.75*
Without Latch.....*doz.* ....*@$1.35*
Western:
With Latch.....*doz. $1.75*
Without Latch.....*doz. $1.15*
Wrightsville H'dware Co.:
Shepard's or Clark's, doz. sets,

No.	1	2	3
Hinges with Latches	$2.00	2.70	5.00
Hinges only	1.40	2.05	3.80
Latches only	.70	.70	1.35

Spring Hinges—

Holdback Cast Iron gro...$9.00@9.50
Non-Holdback, Cast iron.....
gro. $8.00@8.50

J. Bardsley
Bardsley's Non-Checking Mortise Floor Hinges.....45%
Bardsley's Patent Checking.....15%
Bommer Bros.:
Bommer Ball Bring Floor Hinges40%
Bommer Spring Hinges.....40%
Chicago Spring Butt Co.:
Chicago Spring Hinges.....25%
Triple End Spring Hinges.....50%
Chicago (Ball Bearing) Floor Hinge.....50%
Garden City Engine House.....25%
Keene's Saloon Door.....25%
Columbian Hdw. Co.:
Acme, Wrt. Steel.....30%
Acme, Brass.....25%
American.....30%
Columbia, No. 14.....₱ gr. $9.00
Columbia, No. 18.....₱ gr. $25.00
Columbia, Adjustable, No. 7, ₱ gr. $12.00
Gem, new list.....30%
Clover Leaf.....₱ gr. $12.50
Oxford, new list.....30%
Lawson Mfg. Co.:
Matchless.....30%
Matchless Pivot.....45%
Shelby Spring Hinge Co.:
Crown Jamb Hinge.....40%
Chief Ball Bearing Floor Hinge.45%
Royal Ball Bearing Floor Hinge..45%
The Stover Mfg. Co.:
Ideal, No. 16, Detachable, ₱ gr $12.50
Ideal, No. 4.....₱ gr. $9.00
New Idea No. 1.....₱ gr. $9.00
New Idea, Double Acting.....35%
Extra 10% often given on most of these Hinges.

Wrought Iron Hinges—

Strap and T Hinges, &c., list Mar. 15, 1901:
Light Strap Hinges.....80c&5%
Heavy Strap Hinges 80c&20c&10%
Light T Hinges.....75c&10c&5%
Heavy T Hinges.....75c&5%
Extra Heavy T Hinges..80c&2%
Hinge Hasps.....70%
Cor. Heavy Strap....80c&20c&10%
Cor. Ex. Heavy T.....80c&20
Ex-10c&5@10c&10&5%

Screw Hook and Strap. { *6 to 12 in*.....*lb. 3½c* / *14 to 20 in*.....*lb. 3 c* / *22 to 36 in*.....*lb. 2¾c*
Screw Hook and Eye:
¾ to 1 inch.....*lb. 6 c*
½-inch.....*lb. 7 c*
⅜-inch.....*lb. 9 c*

Hitchers, Stall—

Covert Mfg. Co., Stall Hitchers.....35%

Hods, Coal—

	15	*16*	*17*	*18 inch.*
Galv. Open	*$2.50*	*2.75*	*3.00*	*3.25* ₱ *doz.*
Jap. Open	*$2.00*	*2.25*	*2.50*	*2.75* ₱ *doz.*
Galv. Funnel	*$3.00*	*3.25*	*3.50*	*3.75* ₱ *doz.*
Jap. Funnel	*$2.50*	*2.75*	*3.00*	*3.25* ₱ *doz.*

Masons, Etc.—

Cleveland Wire Spring Co.:
Steel Mortar.....each $1.45
Steel Brick.....each $1.10

Hoes— Eye—

Scovil and Oval Pattern.....
60&10@60&10&10%
Grub, list Feb. 23, 1899.....
70&10@75%
D. & H. Scovil.....35%

Handled—

Aug. 1, 1899, List:
Field and Garden.....70&10%
Smith's Patent.....50%
Meadow & Rhode Island.....75%
Black Diamond.....70&10%
Mortar and Street.....70&10&10%
Planters'.....75&12½%
Cotton.....70&10&10%
Cotton Chopper.....75&12½%
Weeding Hoes.....66⅔&15%
Steel Weeders.....66⅔&15%
Malleable Weeders.....66⅔&15%
Ft. Madison Cotton Hoe.....70&10&10%
Ft. Madison Crescent Cultivator Hoe per doz.....70&10%
Ft. Madison Mattock Hoes:
Regular Weight.....₱ doz. 66⅔%
Junior Size.....₱ doz. $4.00
Ft. Madison Sprouting Hoe, ₱ doz. 50%
Ft. Madison Dixie Tobacco Hoe.....
75&10&7½%
Kretsinger's Cut Easy.....70&10%
Warren Hoe.....35%
W. & C. Ivanhoe.....75&2%
B. B. 6 in, Cultivator Hoe.....$3.15
B. B. 6½ in.....$3.85
Acme Weeding.....₱ doz., net, $4.35
W. & C. Lightning Shuffle Hoe, ₱ doz. $4.85

Hoisting Apparatus—

See *Machines, Hoisting.*

Holders— Bit—

Angular, ₱ doz. $24.00.....45&5%

Door—

Empire.....50%
Bardsley's.....45%

File and Tool—

Nicholson File Holders and File Handles.....33⅓@40%

Hooks—

Cast Iron—

Bird Cage, Reading.....50&10%
Bird Cage, Sargent's List.....60%
Ceiling, Sargent's List.....50&10%
Clothes Line, Reading List.....50%
Clothes Line, Sargent's List..50&20&10%
Coat and Hat, Sargent's List..50&20&10%
Clothes Line, Stowell's.....70%
Coat and Hat, Reading.....50%
Coat and Hat, Stowell's.....70%
Coat and Hat, Wrightsville.....65%
Harness, Reading List.....50&10%
Harness, Stowell's.....60%
School House, Stowell's.....70%

Wire—

Belt.....*80c&10%*
Wire C. & H. Hooks.....*75@75&10%*
Atlas, Coat and Hat:
Single Cases.....70%
10 Case Lots.....70&10%
Columbian Hdw Co. Gem.....60&10%
Parker Wire Goods Co.: King.....70&10%
Western W. G. Co. Molding.....75%

Wire Goods Co:
Acme.....60&10%
Chief.....70%
Crown.....70&10%
Czar.....65%
V Brace.....70&10%
Czar Harness.....50&10%

Wrought Iron—
Box, 6 in., per doz. $1.00; 8 in., $1.25; 10 in., $2.50.
Cotton.....doz. $1.05@1.25
Wrought Staples, Hooks, &c.—
See *Wrought Goods.*

Miscellaneous—
Hooks, Bench, see *Stops, Bench.*
Bush, Light, doz. $5.50; Medium, $6.00; Heavy, $6.50

Grass.....Nos.	*1*	*2*	*3*	*4*
Best.....	*$1.50*	*1.75*	*2.00*	
Common.....	*$1.30*	*1.50*	*1.60*	*1.60*

Potato and Manure .....60c&15%
Whiffletree.....lb. 5¼@6c
Hooks and Eyes:
Brass.....60c&10c&10@70%
Malleable Iron.....70c&5@70c&10%
Covert Saddlery Works' Self Locking Gate and Door Hook.....60%
Ft. Madison Cut-Easy Corn Hooks, ₱ doz. $5.25 net
Bench Hooks—See *Bench Stops.*
Corn Hooks—See *Knives, Corn.*

Horse Nails—See *Nails, Horse*
Horseshoes—
See *Shoes, Horse.*

Hose Rubber—
Garden Hose, ¾-inch:
Competition.....ft. 4½@ 5 c
3-ply Standard.....ft. 6½@ 7 c
4-ply Standard.....ft. 7½@ 8 c
3-ply extra.....ft. 8½@ 9 c
4-ply extra.....ft. 10 @10½c
Cotton Garden, ¾-in., coupled:
Low Grade.....ft. 6 @7 c
Fair quality.....ft. 8 @9 c

Irons—Sad—
From 4 to 10.....lb. 2¾@3 c
B. B. Sad Irons.....lb. 3½@3½c
Chinese Laundry.....lb. 4¼@5c
Chinese Sad.....lb. 4@4½c
Mrs. Potts', per set:

Nos.....	*50*	*55*	*60*	*65*
JapdTops	*71*	*68*	*81*	*78*
TinaTops	*74*	*71*	*84*	*81*

New England Pressing, lb.. 3½@4c

Pinking—
Pinking Irons.....doz. 50@60c

Soldering—
Soldering Coppers 2¼ and 3..19@20c
1¼ and 2.....21@22c

Jacks Wagon—
Covert Mfg. Co.:
Auto Screw.....80&5%
Steel.....45&2%
Covert's Saddlery Works':
Daisy.....60&10%
Victor.....60&10%
Lockport.....50%
Lane's Steel.....30&10%

Kettles—
Brass, Spun, Plain.....20@25%
Enameled and Cast Iron—See *Ware, Hollow.*

Knives—
Butcher, Kitchen, &c.—
Foster Bros.' Butcher, &c.....30%
Smith & Hemenway Co.....40&10%
Wilkinson Shear & Cutlery Co.....50%
Hay and Straw—See *Hay Knives.*

Corn—
Withington Acme, ₱ doz., $2.65; Dent, $2.75; Adj. Serrated, $2.20; Serrated, $2.10; Yankee No. 1, $1.50; Yankee No. 2, $1.15.

Drawing—
Standard List.....70&5@70c&10%
Bradley's.....35%
C. E. Jennings & Co. Nos. 45, 46..60&10%
Jennings & Griffin, Nos. 51, 52..60&10&10%
Ohio Tool Co.'s.....70%
Swan's.....70&10&2½%
Watrous.....10%&10%
L. & L. J. White.....20&5@25%

Hay and Straw—
Lightning.....₱ doz. $6.50@7.00
Iwan's Sickle Edge.....₱ doz. $10.00
Iwan's Serrated.....₱ doz. $10.00
Maine.....₱ doz. $8.50

Mincing—
Buffalo.....₱ gro. $13.00

Miscellaneous—
Farriers'.....doz. $3.00@3.25
Wossenhoim's.....₱ doz. $3.00@3.25

Knobs—
Base, 2¼-inch, Birch, or Maple, Rubber tip, gro.....$1.10@1.15
Carriage, Jap, all sizes..gro. 40@45c
Door, Mineral.....doz. 65@70c
Door, Por. Jap'd.....doz. 70@75c
Door, Por. Nickel....doz. $2.05@2.15
Bardsley's Wood Door, Shutter, &c...15%
Picture, Sargent's.....60&10&10%

Lacing Leather—
See *Belting Leather—*

Ladders, Step Etc.—
Lane's Store.....25%
Myers Noiseless Store Ladders.....30%

Ladies' Melting—
L. & G. Mfg. Co, Low List.....25%
P. S. & W.....50%
Reading.....60%
Sargent's.....45&10%

Lanterns—Tubular—
Regular Tubular No. 0. doz. $4.35@4.75
Lift Tubular..No. 0..doz. $4.75@5.25
Hinge Tubular. No. 0..doz. $4.75@5.25
Other Styles.....40c&10@40c&10c&5%

Bull's Eye Police—
No. 1, 2¾ inch.....$2.50@2.75
No. 2, 3 inch.....$2.75@3.00

Lasts and Stands Shoe—
Stowell's Atlas, Malleable Iron.....50%
Stowell's Reducer, Cast Iron.....50%

Latches—
Thumb—
Roggin's Latches, w the screw..dz35@40c

Leaders Cattle—
Small.....doz. 55c; large, 60c
Covert Mfg. Co.....45&2%

Lifters, Transom—
R & E.....33⅓%

Lines—

Wire Clothes, Nos...	*18*	*19*	*20*
100 feet.....	*$2.20*	*2.00*	*1.65*
75 feet.....	*$1.80*	*1.70*	*1.50*

Samson Cordage Works:
Solid Braided Chalk, No. 0 to 3.....40%
Silver Lake Braided Chalk, No. 0, $6.00; No. 1, $6.50; No. 2, $7.00; No. 3, $7.50 ₱ gr.....20%
Masons' Lines, Shade Cord, &c.: White Cotton, No. 3½, $1.50; No. 4, $2.00; No 4½, $2.50; Colors, No. 3½, $1.75; No. 4, $2.25; No. 4½, $2.75; Linen, No. 3½, $2.50; No. 4, $3.50; No. 4½, $4.50.....20%
Tent and Awning Lines: No. 5, White Cotton, $7.50; Drab Cotton, $8.50.....20%
Clothes Lines, White Cotton: 50 ft., $2.75; 60 ft., $3.25; 70 ft., $3.75; 75 ft., $4.00; 80 ft., $4.25; 90 ft., $4.75; 100 ft., $5.25..20%
Anniston Waterproof Clothes, 50 ft., ₱ gro.: $26.00; Gilt Edge, $24.00; Air Line $24.00; Acme, $19.00; Alabama, $17.00; Empire, $18.00; Advance, $15.00; Oriole, $22.00; Albermarle, $15.00; Eclipse, $13.50; Chicago, $12.50; Standard, $11.00; Columbia, $9.50.

Locks—Cabinet—
Cabinet Locks.....33⅓@33⅓&7½%

Door Locks, Latches, &c.—
[Net prices are very often made on these goods.]
Reading Hardware Co.....50%
R. & E. Mfg. Co.....40%
Sargent & Co.....40&10%
Stowell's Steel Door Latches.....50%

Elevator—
Stowell's.....50%

Padlocks—
Wrought Iron.....75c&10c&5@30c&5%
R. & E. Mfg. Co. Wrt. Steel and Brass, 75@75&10%

Sash, &c.—
Ives' Patent.:
Bronze and Brass.....62½%
Crescent.....50%
Iron.....62½%
Wrought Bronze and Brass.....55%
Wrought Steel.....55%
Reading.....net 50%

Machines—Boring—
Com. Upright, Without Augers..$2.00
Com. Angular, Without Augers..$2.25
Without Augers.

R. & E. Mfg. Co.:	Upright.	Angular.
Improved No. 3.	$4.25	No. 1 $5.00
Improved No. 4.	3.75	No. 2. 3.38
Improved No. 5.	2.75	
Jennings'...No. 4,	3.15	No. 1, 3.50
Millers' Falls.....		5.75
Snell's, Rice's Pat.	2.50	2.75

Corking—
Reisinger Invincible Hand Power.....
₱ doz. $48.00

Fence—
Williams Fence Machines.....each, $5.50

Hoisting—
Moore's Anti-Friction Differential Pulley Block.....30%
Moore's Hand Hoist, with Lock Brake.30%

Ice Cutting—
Chandler's.....15&10%

Washing—

Boss Washing Machine Co.:	Per doz.
Boss No. 1; Boss Rotary.....	$57.00
Boss No. 7; Dietz Rotary.....	60.00
Champion Rotary; Banner No. 1..	54.00
Standard Champion No. 1.....	48.00
Standard Perfection.....	36.00
Cintl Square Western.....	30.00
Uneeda American, Round.....	29.00

Mallets—
Hickory.....45&5@50%
Lignumvitæ.....45c&5@50%
Tinners', Hickory and Applewood, doz.....50@55c

Mashers, Vegetable—
Westcott, W. G. Co., Potato.....60&10%

Mats—Door—
Elastic Steel (W. G. Co.).....10%

Mattocks—
See *Picks and Mattocks.*

Milk Cans—See *Cans, Milk*
Mills—Coffee, etc.—
Enterprise Mfg. Co.....25@30%
National list Jan. 1, 1902.....30%
Parker's Columbia & Victoria.50&10@60%
Parker's Box and Side.....50&10@60%
Sun, No. 1080, 1 ₱ mill.....₱ doz $3.00
Swift, Lake Bros Co.....30%

Mowers, Lawn—
Net prices are generally quoted.
Cheap.....all sizes. $1.75@2 00
Good.....all sizes, $2.25@2.50

	10	*12*	*14*	*16-inch*
High Grade	*4.25*	*4.50*	*4.75*	*5.00*

Continental.....60&5%
Great American.....70%
Great American Ball Bearing, new list.70%
Quaker City.....70%
Pennsylvania.....60&5%
Pennsylvania, Jr., Ball Bearing.....60%
Pennsylvania Golf.....50%
Pennsylvania Horse.....33⅓&5%
Pennsylvania Pony.....40&5%
Philadelphia:
Styles M., S., C., K. T.....70&5%
Style A, all Steel.....60&5%
Style E, High Wheel.....70&10&5%
Drexel and Gold Coin, low list...40&5%

Nails—
Cut and Wire. See Trade Report.
Wire Nails and Brads, Papered. List July 20, 1899...85c&10c&10@90%
Hungarian, Finishing, Upholsterers', &c. See Tacks.

Horse—

Nos.	6	7	8	9	10	
A. C.....	25	23	22	21	21	.....40&2%
C. B. K.....	25	23	22	21	21	.....40%
Anchor....	23	21	20	19	18	.....40&5%
Champ'n.	28	26	25	24	23	.....50%
Coleman....	13	12	12	11	11	.....net
Maud S....	25	23	22	21	21	.....50%
New Haven.	23	21	20	19	18	.....40&5%
Putnam....	22	21	20	19	18	.....33⅓&5%
New P'tn'm	19	18	17	16	16	.....10&10%

Western, per lb.....8½c
Jobbers' special brands, per lb. 8@8¾c

Picture—

	1½	*2*	*2½*	*3*	*3½ in.*
Brass Head.	*.55*	*.60*	*.70*	*.95*	*1.00 gro.*
Por. Head...	*..*	*1.10*	*1.10*	*1.10*	*.. gro.*

Nippers, See *Pliers and Nippers.*

Nuts—
Cold Punched: Off list.
Mfrs. or U. S. Standard.
Square, plain.....$5.10
Hexagon, plain.....$5.60
Square, C. T. & R.....$5.30
Hexagon, C. T. & R.....$6.00
Hot Pressed:
Mfrs., U. S. or Nar. Gauge Stan'd.
Square Blank.....$5 80
Hexagon Blank.....$6.30
Square Tapped.....$5 80
Hexagon Tapped.....$6 30

Oakum—
Best or Government.....lb. 6¼c
Navy.....lb. 4½c
U. S. Navy.....lb. 5¼c
Plumbers' Spun Oakum.....2¾c
In carload lots ¼c lb. off f.o.b. New York.

Oil Tanks—See *Tanks, Oil.*

Oilers—
Brass and Copper.....60c&10%
Tin or Steel.....70c&10@75%
Zinc.....65c&10%
Chase or Paragon:
Brass and Copper.....45c&10@50%
Tin or Steel.....75@75c&10%
Zinc.....65%
Malleable, Hammers' Improved, No. 1, $3.60; No. 2, $4; No. 3, $4.40 ₱ doz.20%
Malleable, Hammers' Old Pattern, same list.....50&10%
American Tube & Stamping Co.:
Spring Bottom Cans.....70@70&10%
Railroad Oilers etc,.....60@60&10%

Openers—Can—
French.....doz. 35c
Iron Handle.....doz. 25@27c
Sprague, Iron Hdle...per doz. 35@40c
Sardine Scissors...doz. $1.75@$3.00
Marvel.....per doz. $1.25
National.....50%
Stowell's Sprague.....per doz. 35@45c
Tip Top.....per doz. $0.75
Triumph Shear.....₱ gro. $9.00

Egg—
Nickel Plate.....per doz., $2.00
Silver Plate.....per doz., $4.00

Packing—
Asbestos Packing, Wick and Rope, 14½@15c lb.

Rubber—
Sheet, C. I.....8@10c
Sheet, C. O. S.....9@13c
Sheet, C. B. S.....10@11c
Sheet, Pure Gum.....50@65c
Sheet, Red.....40@50c
Jenkins' Standard, ₱ lb 80c...25@25&5%

Miscellaneous—
American Packing.....7@10c lb.
Cotton Packing.....16@25c lb.
Italian Packing.....9@12½c lb.
Jute.....4@4½c lb.
Russia Packing.....8@11c lb.

Pails—Creamery
S. S. & Co., with gauges.. No 1 $0.25; No. 2, $0.50 ₱ doz.

Galvanized—
Price per doz.

Quart.....	*10*	*[illegible]*	*14*
Water, Regular..	*1.50*	*1.75*	*2.00*
Water, Heavy....	*2.75*	*3.00*	*3.25*
Fire, Rd. Bottom.	*2.30*	*2.60*	*2.80*
Well.....	*2.25*	*2.50*	*2.75*

Pans—Dripping—
Standard List.....60c&10@60c&10c&5%

Fry—
Common Lipped:

No.	*1*	*2*	*3*	*4*	*5*
Per doz.	*$0.85*	*1.00*	*1.10*	*1.30*	*1.50*

Roasting and Baking—
Regal, S. S. & Co., ₱ doz., Nos. 5, $4.50; 10 $5.25; 20, $5.75; 30, $6.25.
Savory, ₱ doz., net, Nos. 200, $9.00; 400, $15.00.
Simplex, ₱ gro.:

No.	40	50	60	140	150	160
	$30.00	35.0	42.00	34.00	39.00	46.00

Paper—Building Paper—

Asbestos:	*lb.*
Building Felt.....	*2¾c*
Mill Board, sheet, 40 x 40 inches	*3½c*
Mill Board, roll, thicker than 1-16 inch.....	*3½c*
Mill Board, roll, 1-16 in. thick and less.....	*2½c*
	Per roll
Rosin Sized Sheathing:	*500 sq. ft.*
Light wt., 25 lbs. to roll..	*$0.40@0.45*
Medium wt., 30 lbs. to roll..	*$0.45@0.50*
Heavy wt., 40 lbs. to roll..	*$0.65@0.70*
Black Water Proof Sheathing, 500 Sq. ft., 1 ply, 60c; 2 ply, 85c; 3 ply, $1.10; 4 ply, $1.25.	
Deafening Felt, 2, 6 and 4¼ sq. ft. to lb., ton.....	*$41.00*
Red Rope Roofing, 250 sq. feet per roll.....	*$1.75*

NOTE.—*These goods are often sold at delivered prices.*

Tarred Paper.
1 ply (roll 200 sq. ft.), ton..$32.50@35.00
2 ply, roll 108 sq. ft.....55@60c
3 ply, roll 108 sq. ft.....78@80c
Slater's Felt (roll 500 sq. ft.).....75c
NOTE.—*Above prices often include delivery, and are for Eastern territory, where prices are controlled by agreement between the manufacturers. In open territory much lower prices are current.*
R. R. M. Stone Surfaced Roofing (roll 110 sq. ft.).....$2.00

Sand and Emery—
Flint Paper and Cloth...50c&10@60%
Garnet Paper and Cloth.....25%
Emery Paper and Cloth...50c&10@60%

Parers—Apple—
Advance.....₱ doz. $4.50
Baldwin.....₱ doz. $5.00
Bonanza Improved.....each $6.50
Daisy.....₱ doz. $4.00
Dandy.....each $7.50
Eureka Improved.....each $20.00
Family Bay State.....₱ doz. $15.00
Improved Bay State.....₱ doz. $36.00
Little Star.....₱ doz. $5 00
New Lightning.....₱ doz. $7.50
Reading 72.....₱ doz. $4.00
Reading 78.....₱ doz. $7.00
Rocking Table.....₱ doz. $6.00
Turn Table '98.....₱ doz. $6.75
White Mountain.....₱ doz. $6.00

Potato—
Saratoga.....₱ doz. $7.00
White Mountain.....₱ doz. $6 00

Picks and Mattocks—
List Feb. 23, 1899.....70c&5c&10c&10%

Pinking Irons—
See *Irons, Pinking.*

Pins—Escutcheon—
Brass.....60@60c&10%
Iron, list Nov. 11, '85.....60@60c&10%

Pipe, Cast Iron Soil—
Standard, 2-5 in.....50c&10%
Extra Heavy, 2-6 in.....65%
Fittings.....70%

Pipe, Merchant,
Steel Carload Lots, f.o.b, Pittsburgh.

Merchant Pipe.	*Black.*	*Galvanized.*
⅛, ¼, ⅜ inch.....	*68%*	*53%*
½ inch.....	*71%*	*61%*
¾ to 6 inch.....	*75%*	*65%*
7 to 12 inch.....	*71%*	*61%*

Pipe, Sewer—
Jobbers' Prices—
Standard Pipe and Fittings, 2 to 24 in.
New England.....67%
New York and New Jersey.....70%
Maryland, Delaware, East Penn.72%
West Penn and West Va.....73%
Virginia.....75%
Ohio, Michigan and Ky.....75%
Indiana.....77%
Carload lots are generally delivered.

Pipe, Stove—
Edwards' Nested Stove Pipe:

	C. L.	L. C. L.
5 in., per 100 joints ...	$7.50	$8 50
6 in., per 100 joints....	8.00	9.00
7 in., per 100 joints....	9.00	10.00

Planes and Plane Irons—
Wood Planes—
Bench, First quality....40c&5@40c&10%
Bench, Second qual....50c&5@50c&10%
Molding.....33⅓&5@33⅓&10%
Bailey's (Stanley R. & L. Co) 5&10@25&10&10%
Chapin-Stephens Co.:
Bench, First Quality.....40@40&10%
Bench, Second Quality.....50@50&10%
Molding.....33⅓@33⅓&10%
Toy and German.....40@40&10%
Gage Self Setting.....35%
Ohio Tool Co.:
Bench, First Quality.....40@40&10%
Bench, Second Quality.....40@50&10%
Molding.....33⅓@33⅓&10%
Adjustable Wood Bottom.....60%
Union.....60%

Iron Planes—
Bailey's (Stanley R. & L. Co).....25&10@25&10&10%
Chaplin's Iron Planes.....50&10%
Miscellaneous Planes (Stanley R. & L. Co.).....20&10@20&10&10%
Sargent's.....60@60&10%
Union.....60%

Plane Irons—
Wood Bench Plane Irons.....30c&5@30c&10%
Buck Bros.....30%
Chapin-Stephens Co.....30@30&10%
Ohio Tool Co.....30%
Stanley R. & L. Co...20&10@20&10&10%
L. & L. J. White.....20&5@25%

Planters, Corn, Hand.
Kohler's Eclipse.....₱ doz. $8.50

Plates—
Felloe.....lb. 3½@4c
Self-Sealing Pie Plates (S. S. & Co.), ₱ doz. $2.00.....50%

Pliers and Nippers—
Button Pliers.....75@75c&10%
Gas Burner, per doz., 5 in., $1.25@ $1.50; 6 in., $1.45@$1.50

Gas Pipe..	*7*	*8*	*10*	*12-in.*
	$2.00	*$2.25*	*$3.00*	*$3.75*

Acme Nippers.....50@50&5%
Bernard's:
Cutting Nippers.....33⅓%
Parallel, Pliers.....33⅓%
Paragon Pliers.....50%
Lodi Pliers.....50%
Elm City Fence Pliers.....33⅓%
Cronk & Carrier Mfg. Co.:
American Button.....75&10%
Cronk's.....60%
Improved Button.....70&10%
Stub's Pattern.....50%
Combination and others.....33⅓%
Heller's Farriers' Nippers, Pincers, and Tools 40&10@40&10&10%
P., S. & W. Tinners' Cutting Nippers, 30@30&10%
Swedish Side, End and Diagonal Cutting Pliers.....50%
Utica Drop Forge & Tool Co.:
Pliers and Nippers, all kinds.....40%

Plumbs and Levels—
Chapin Stephens Co.:
Plumbs and Levels.....30@30&10&10%
Chapin's Imp. Brass Cor 40@40&10&10%
Pocket Levels.....30@30&10&10%
Level Glasses.....60@60&10&10%
Disston's Plumbs and Levels.....70%
Disston's Pocket Levels.....70
C. E. Jennings & Co.'s Iron.....25&10%
C. E. Jennings & Co.'s Iron, Adjustable. 33⅓&10%
Stanley R. & L. Co...30&10@30&10&10%

Stanley's Duplex.....20@20&10&10%
Woods' Extension.....30&5%

Poachers, Egg—

Buffalo Steam Egg Poachers, ₱ doz., No. 1, $6.00; No. 2, $9.00; No. 3, $4.00; No. 4, $12.00.....50%

Points, Claziers'—

Bulk and 1 lb. papers.....lb. 6¼c
¼-lb. papers.....lb. 6½c
½-lb. papers.....lb. 6¾c

Pokes, Animal—

Ft. Madison Hawkeye.....₱ doz. $3.25
Ft. Madison Western.....₱ doz. $4.00

Police Goods—

Manufacturers' Lists.....25@25&5%
Tower's.....25%

Polish—Metal—

Prestoline Liquid, No. 1 (¼ pt.), ₱ doz. $3.00; No. 2 (1 qt.), $9.72.....40%
Prestoline Paste.....40&10%
George William Hoffman:
U. S. Metal Polish Paste, 3 oz. boxes, ₱ doz. 50¢; ₱ gr. $4.50; ½ lb boxes, ₱ doz. $1.25; 1 lb boxes, ₱ doz. $2.25.
U. S. Liquid, 8 oz. cans, ₱ doz. $1.25; ₱ gr. $12.00.
Barkeepers' Friend Metal Polish, ₱ doz. $1.75; ₱ gr. $18.00.
Wynn's White Silk, ¼ pt. cans, ₱ doz.....$2.00

Stove—

Black Eagle Benzine Paste, 5 lb cans.. ₱ lb 10¢
Black Eagle, Liquid, ¼ pt. cans ₱ doz. 75¢
Black Jack Paste, ¾ lb cans. ₱ gro. $9.00
Black Kid Paste, 5 lb can.....each, $0.65
Ladd's Black Beauty, gr. $10.00.....50%
Joseph Dixon's, ₱ gr. $5.75.....10%
Dixon's Plumbago.....₱ lb 8¢
Fireside.....₱ gr. $9.50
Gem, ₱ gr. $4.50.....10%
Japanese.....₱ gr. $3.50
Jet Black.....₱ gr. $3.50
Peerless Iron Enamel, 10 oz. cans..... ₱ doz. $1.50
Wynn's:
Black Silk, 5 lb pail.....each 70¢
Black Silk, ½ lb box.....₱ doz. $1.00
Black Silk, 5 oz. box.....₱ doz. $0.75
Black Silk, ¼ pt. liq.....₱ doz. $1.00

Poppers, Corn—

1 qt., Square.....gro. $9.00
1 qt., Round.....gro. $10.00
1½ qt., Square.....gro. 11.00
2 qt., Square.....gro. 15.00

Post Hole and Tree Augers and Diggers—

See also *Diggers, Post Hole, &c.*

Posts, Steel—

Steel Fence Posts, each, 5 ft., 42¢; 6 ft., 46¢; 6½ ft., 48¢.
Steel Hitching Posts, each.....$1.30

Potato Parers—

See *Parers, Potato.*

Pots— Glue—

Enameled.....40%
Tinned.....35%

Powder—

In Canisters:
Duck, 1 lb. each.....45c
Fine Sporting, 1 lb. each.....75c
Rifle, ½-lb. each.....15c
Rifle, 1-lb. each.....25c
King's Semi-Smokeless:
Keg (25 lb bulk).....$6.50
Half Keg (12½ lb bulk).....$3.50
Quarter Keg (6¼ lb bulk).....$1.90
Case 24 (1 lb cans bulk).....$8.50
Half case (1 lb cans bulk).....$4.50

King's Smokeless:	Shot Gun	Rifle
Keg (25 lb bulk)	$12.00	$15.00
Half Keg (12½ lb bulk)	6.25	7.75
Quarter Keg (6¼ lb bulk)	3.25	4.00
Case 24 (1 lb cans bulk)	14.00	17.00
Half case 12 (1 lb cans bulk)	7.25	8.75

Robin Hood smokeless Shot Gun..50&20%

Presses—Fruit and Jelly—

Enterprise Mfg. Co.....20@25%
Sensible.....35&5%
2 qt., $2.00; 4 qt., $4.00; 10 qt., $6.00 each.

Seal Presses—

Morrill's No. 1, per doz. $20.00.....50%

Pruning Hooks and Shears—See *Shears.*

Pullers, Nail—

Cyclops.....50%
Dudly Improved Nail Puller.....50%
Miller's Falls, No. 3, per doz. $13.00..... 33⅓&10%
Pearson No. 1, Cyclone Spike Puller, each $30.00.....50%
Pelican, ₱ doz. $9.00.....40&10%
Scranton, Case Lots:
No. 2 B (large).....$5.50
No. 3 B (small).....$3.00
Smith & Hemenway Co.:
Ajax.....60%
Diamond B, No. 2, case lots, ₱ doz $6.00
Diamond B, No. 3, case lots, ₱ doz $5.50
Eureka.....50%
Giant, No. 1, ₱ doz. $18; No. 2, $16.50; No. 3, $15.....40%
Yankee.....60&5%

Pulleys—Single Wheel—

Inch.....	*2*	*2¼*	*3*
Awning...doz	$0.55	.85	1.15
Hay Fork, Swivel or Solid Eye.... doz., 4 in., $1.15; 5 in., $1.40			
Inch.....	*2*	*2¼*	*2½*
Hot House..doz	$0.70	.90	1.25
Inch.....	*1¼*	*1½*	*1¾*	*2*
Screw.....doz	$0.16	.19	.23	.30
Inch.....	*1¼*	*2*	*2¼*	*2½*
Side.....doz	$0.30	.40	.55	.63
Inch.....	*1¼*	*1¾*	*2*	*2½*
Tackle....doz	$0.30	.42	.53	1.00

Stowell's:
Ceiling or End, Anti-Friction..60&10%
Dumb Waiter, Anti-Friction...60&10%
Electric Light.....60%
Side, Anti-Friction.....60&10%

Sash Pulleys—

Common Frame; Square or Round End, per doz., 1¼ and 2 in...16@19c
Auger Mortise, no Face Plate, per doz. 1¾ and 2 in.....16@19c
Auger Mortise, with Face Plate, per doz., 1¾ and 2 in......16@19c
Acme.....1¾ in., 16¢; 2 in., 19¢
Common Sense, 1¾ in.... ₱ doz., 18¢; 2 in., 20¢.
Fox-All-Steel, Nos. 3 and 7, 2 in. ₱ doz 50%
Grand Rapids All Steel Noiseless....50%
Ideal.....70&5%
Niagara.....1¾ in., 16¢; 2 in., 19¢
No. 26, Troy....1¾ in., 14½¢; 2 in., 16½¢
Star.....1¾ in., 16¢; 2 in., 19¢
Tackle Blocks—See *Blocks.*

Pumps—

Cistern.....60@6&10%
Pitcher Spout.....80@80&10%
Wood.....50@50&10%

Pump Leathers—

Plunger and Lower Valve—Per gro.:

Inch..	*2*	*2¼*	*2½*	*2¾*
	$2.20	2.50	2.75	3.00
Inch..	*3*	*3¼*	*3½*	*3¾*	*4*
	$3.30	3.60	3.85	4.10	4.40

Plunger Cup Leathers—Per 100:

Inch	*2½*	*3*	*3½*	*4*
	$2.75	3 85	5.00	6.00

Barnes Dbl. Acting (low list).... 50&10%
Contractors' Rubber Diaphragm No. 2 B. & L. Block Co.....$16.00
Daisy Spray Pump.....₱ doz. $7.20
Flint & Walling's Fast Mail (low list).55%
Flint & Walling's Pitcher Spout.....80%
National Specialty Mfg. Co., Measuring, $6.00.....30%
Mechanical Sprayer.....$7.20
Myer's Pumps, low list.....50%
Myers' Power Pumps.....50%
Myers' Spray Pumps.....50%

Punches—

Saddlers' or Drive, good...doz. 65@70c
Spring, single tube, good quality... $1.75@2.00
Revolving (4 tubes)...doz. $3.50@3.75
Bemis & Call Co.'s Cast Steel Drive....50%
Bemis & Call Co.'s Check.....55%
Benard Spring Belt Punches.....33⅓%
Lodi Spring Belt Punches.....50%
Morrill's No. 1 (A.B.C.), ₱ doz., $15.00...50%
No. 2, ₱ doz. $22.50.....50%
Hercules, each $7.50.....50%
Niagara Hollow Punches.....40%
Niagara Solid Punches.....55&10%
Paragon Spring Belt Punches.....50%
Steel Screw, B & K. Mfg. Co.....40%
Tinners' Hollow, P., S. & W. Co.35@35&5%
Tinners' Solid, P., S. & W. Co., ₱ doz., $1.44.....60%

Rail— Barn Door, &c.—

Cast Iron, Barn Door: Flange Screw Holes for Rd. Groove Wheels:

	⅜	⅝	¾	*In.*
	$1.70	$2.10	$3 00	*100 feet.*

Angular for Sq. Groove Wheels:

Small.	*Med.*	*Large.*	
$1.50	1.90	2.60	*100 feet.*

Sliding Door, Iron Painted..2¼@3¼c
Sliding Door, Wrought Brass, 1⅛ in.....lb.36c...30%
Allith Mfg. Co., No. 1, Reliable Hanger Track, ₱ foot.....8¢
Allith Mfg. Co., No. 2, Reliable Hanger Track, ₱ foot.....10¢
Cronk's Double Braced Steel Rail, ₱ foot.....3½¢
Cronk's O. N. T. Rail.....3½¢
Lane's Hinged Track, ₱ 100 ft., 1 in., $3.70; 1¼ in., $4.40
Lanes' O. N. T., ₱ 100 ft., 1 inch, $3.00; 1¼ inch, $3.70; 1¼ inch, $4.00.
Lanes' Standard, 1¼ in., ₱ 100 ft 4.00
Lawrence Bros., ₱ ft. 11¢.....60%
Lawrence Bros. New York.....3½¢
McKinney's Hinged Hanger Rail ₱ foot, 11¢.....50%
McKinney's None Better.....₱ ft. 8½¢
McKinney's Standard .....₱ ft. 4 ¢
Myers' Stayon Track.....50&10%
Safety Door Hanger Co.'s Storm King Safety.....60%
Safety Door Hanger Co.'s U.S. Standard 60%
Smith's Wrought Bracket, Plain.....3½¢
Smith's Special.....4½¢
Smith's Never Jump, per ft. 11¢.....50%
Smith's Plain Steel.....30%
Smith's Milled Steel.....4½¢
Stowell's Cast Rail .....₱ ft. 1½¢
Stowell's Steel Rail, Plain.....25%
Stowell's Wrought Bracket, 1 3-16 in.... ₱ ft. 8¢
Stowell's Wrought Bracket, 1¼x5-16.... ₱ ft. 7¢
Swett's Hylo, per ft. 11¢.....50&10%
Swett's P. L. B. Steel Rail, ₱ 100 ft. $3.00

Rakes—

Net Prices, Malleable Rakes:

	10	*12*	*14*	*16-tooth*
Shank.....	$1.50	1.60	1.75	1.85
Socket.....	$1.65	1.80	1.95	2.10

Steel, Garden and Gravel, Aug. 1, '99 List.....70%
Weldless Steel.....75&5%
Malleable Iron, Garden.....70&10%
Lawn Rakes, Metal Head, per doz., 20 teeth.....$3.25@3.50
24 teeth.....$3.50@3.75
Fort Madison Red Head Lawn.....$3 25
Fort Madison Blue Head Lawn.....$2.70
Jackson Lawn, 20 and 30 teeth, ₱ doz., net, $4.25
Kohler's:
Lawn Queen, 20-tooth, ₱ doz.....$3.45
Lawn Queen, 24-tooth, ₱ doz $3.60
Paragon, 20-tooth, ₱ doz.....$2.75
Paragon, 24-tooth, ₱ doz.....$3.00
Steel Garden, 14-tooth, ₱ doz.....$2.80
Malleable Garden, 14-tooth, ₱ doz...$2.00

Rasps, Horse—

Disston's.....75%
Heller Bros.....70&5&70&10&5%
McCaffrey's American Standard..... 60&10&5%
New Nicholson.....70&10&75%
See also *Files.*

Razors—

Boraste.....60 & 10%
Fox Razors, No. 42, ₱ doz. $30.00 } 40%
Fox Razors, No. 44, ₱ doz. $20.00 } 40%
Fox Razors, No. 87, Platina, ₱ doz. $25.00
Red Devil.....60%
Silberstein:
Carbo Magnetic.....$18.00
Griffon, No. 65.....$15.00
Griffon, No. 60.....$12.00
All other Razors.....40%

Safety Razors—

Safety Razors.....40%
New Gem, in Tin Boxes.....₱ doz. $12.00
New Gem, Extra Blades.....₱ doz. $8.35
Gem Outfits (Razor, Strop, etc.)..... ₱ doz. $25.60
Complete Razor, extra Blade in Leather Case.....₱ doz. $27.00
Silberseein.....40%

Reels— Fishing—

Bishop's Independent Fish Reel Spooler, ₱ doz.....$30.00
Hendryx:
M 6, Q 6, A 6, B 6, M 9¼, M 18, Q 16, A 16, B 16, 4008, Rubber Populo, Nickeled Populo.....20%
Aluminum, German Silver, Bronze.25%
1240 N, 124 N.....20%
3004 N, 06 N, 6 RM, G 9.....25%
4 N, 6 PN, 24 N, 26 PN.....20%
2904 P.....33⅓%
2904 PN.....33⅓%
0924 N.....33⅓%
02084 N.....33⅓%
002904 PN.....33⅓%
802 N.....33⅓%
986 PN, 2904 N, 974 PN.....25%
5009 PN, 5009 N.....20%
Competitor, 102 P, 102 PN, 202 P, 202 PN, 102 PR, 202 PR.....20%
304 P, 304 PN, 00304 P, 00304 PN.33⅓%

Registers—*List July 1, 1903.*

Black Jap
White Jap
Bronzed
Nickel Plated
Electro Plated
} 75@75&10

Registers, Cash—

Sun, No. 10, Metal Cabinet.....$30.00
Sun, No. 10, Wood Cabinet.....$25.00

Revolvers—

Single Action.....85@90c
Double Act'n, except 44 cal......$1.90
Double Action, 44 caliber.....$2.05
Automatic.....$3.60
Hammerless.....$4.10
Note.—Jobbers frequently cut the above prices of manufacturers for small trade.

Riddles, Hardware Grade

16 in., per doz.....$2.25@$2.50
17 in., per doz.....$2.50@$2.75
18 in., per doz.....$2.75@$3.00

Rings and Ringers—Bull Rings—

	2	*2½*	*3 Inch*
Steel.....	$0 70	0.75	0.80 *doz.*
Copper.....	1.00	1.15	1.40 *doz.*

Hog Rings and Ringers—

Hill's Rings....gro. boxes, $4.25@4.50
Hill's Ringers, Gray Iron. doz. 50@55c
Hill's Ringers, Mal. Iron, doz. 70@75c
Blair's Rings.....per gro. $5.00@5.25
Blair's Ringers...per doz. $0.60@ .65
Brown's Rings....per gro. $5.25@5.50
Brown's Ringers..per doz. $0.65@ .70

Rivets and Burrs—

Copper.....60@60c&5%
Iron or Steel.....75c&5@75c&10%

Rollers—

Acme, Stowell's Anti-Friction.....50%
Barn Door, Sargent's list.....60%
Cronk's Stay.....66⅔&5%
Cronk's Brinkerhoff.....66⅔&5%
Lane's Stay.....33⅓&5%
Stowell's Barn Door Stay.....₱ doz. $1.00

Rope—

Manila, 7-16 in. diam. and larger, tarred or untarred.....lb. .. @12 c
Manila, Hay, Hide and Bale Ropes, Medium and Coarse.....lb. .. @12 c
Sisal, 7-16 in. diam. and larger:
Mixed.....lb. .. @ 8 c
Pure.....lb. .. @ 9¼c
Sisal, Hay, Hide and Bale Ropes, Medium and Coarse:
Mixed.....lb. .. @ 8 c
Pure.....lb. .. @ 9¼c
Sisal, Tarred, Medium Lath Yarn:
Mixed.....lb. .. @ 7½c
Pure.....lb. .. @ 8¼c
Cotton Rope: —Lb.—
Best....¼-in. and larger..18@25c
Medium..¼-in. and larger..16@18c
Com....¼-in. and larger..12@13c
Jute Rope:
Thread No. 1, ¼-in. and up, lb. 6 c
Thread No. 2, ¼-in. and up, lb. 5½c
Old Colony Manila Transmission Rope, ₱ lb 17½¢

Wire Rope—

Galvanized.....47½&5%
Plain.....55&5%

Ropes, Hammocks—

Covert Mfg. Co.:
Jute.....40&5%
Sisal.....30%
Covert Saddlery Works.....60&5%

Rules—

Boxwood.....60&10c&10%
Ivory.....35c&10@35c&10c&5%
Chapin-Stephens Co.:
Boxwood.....60@60&10%
Ivory.....35@35&10&10%
Miscellaneous.....50@50&10&10%
Combination.....55@55&10%
Stationers'.....10@10&10%
Lufkin's Steel.....50&10%
Lufkin's Lumber.....60&10%
Stanley R. & L. Co.:
Boxwood.....60@60&10%
Ivory.....35@35&10&10%
Upson Nut Co.:
Boxwood.....60@60&10%
Ivory.....35&10@35&10&10%

Sash Locks—See *Locks, Sash*

Sash Weights—See *Weights, Sash.*

Sausage Stuffers or Fillers—see *Stuffers or Fillers, Sausage.*

Saw Frames—See *Frames, Saw.*

Saw Sets—See *Sets, Saw.*

Saw Tools—See *Tools, Saw.*

Saws—

Atkins:
Circular.....50%
Band.....50&10@60%
Cross Cuts.....35&5%
Mulay, Mill and Drag.....50%
One-Man Saw.....40%
Wood Saws.....40%
Hand, Compass, &c.....40%
Chapin-Stephens Co.:
Turning Saws and Frames....30@30&10%
Diamond Saw & Stamping Works:
Sterling Kitchen Saws.....30&10&5%
Disston's:
Circular, Solid and Inserted Tooth..50%
Band, 3 to 14 in. wide.....60%
Band, ¼ to 2¾.....70%
Crosscuts.....45%
Narrow Crosscuts.....50%
Mulay, Mill and Drag.....50%
Framed Woodsaws.....35%
Woodsaw Blades.....35%
Woodsaw Rods.....25%
Hand Saws, Nos. 12, 99, 9, 16, d100, D8, 120, 79, 77, 6.....25%
Hand Saws, Nos. 7, 107, 107½, 8, 1, 0, 00, Combination.....30%
Compass, Keyhole, &c.....25%
Butcher Saws and Blades.....35%
C. E. Jennings & Co.'s.:
Back Saws.....25&10%
Butcher Saws.....30&10%
Compass and Key Hole Saws.35&5&10%
Framed Wood Saws.....30&10%
Hand Saws.....20&2½&10%
Wood Saw Blades.....30&10%
Millers Falls:
Butcher Saws.....15&10%
Star Saw Blades.....15&10%
Peace & Richardson's Hand Saws.....30%
Simonds':
Circular Saws.....50%
Crescent Ground Cross Cut Saws..35%
One-Man Cross Cuts.....40&10%
Gang Mill, Mulay and Drag Saws..50%
Band Saws.....50%
Back Saws.....25@25&7½%
Butcher Saws.....35@35&7½%
Hand Saws.....25@25&7½%
Hand Saws, Bay State Brand.....45%
Compass, Keyhole, &c .....25@25&7½%
Wood Saws.....25@35&7½%
Wheeler, Madden & Clemson Mfg. Co.'s Cross Cut Saws.....50%

Hack Saws—

Atkins' Hack Saw Blades A A A.....25%
Disston:
Concave Blades.....25%
Keystone.....40%
Hack Saw Frames.....30%
Fitchburg File Works, The Best.....25%
C. E. Jennings & Co.'s:
Hack Saw Frames, Nos. 175, 180..... 35&5&10%
Hack Saws, Nos. 175, 180, complete. 35&5&10%
Goodell's Hack Saw Blades.....40%
Griffin's Hack Saw Frames ...35&5&10%
Griffin's Hack Saw Blades.....35&5&10%
Star Hack Saws and Blades.....15&10%
Sterling Hack Saw Blades.....35%
Sterling Hack Saw Frames.....30&10&5%

Scroll—

Barnes' No. 7, $15.....25%
Barnes' Scroll Saw Blades.....40%
Barnes' Velocipede Power Scroll Saw, without boring attachment, $18; with boring attachment, $20.....20%
Lester, complete, $10.00.....15&10%
Rogers, complete, $4.00.....15&10%

Scalers, Fish—

Bishop's Lightning.....₱ doz. $3.00
Covert's Saddlery Works.....60&10%

Scales—

Family, Turnbull's.....50@50c&10%
Counter:
Hatch, Platform, ¼ oz to 8 lbs. doz $5.50
Two Platforms, ½ oz to 8 lbs. doz. $16
Union Platform, Plain...$1.70@1.90
Union Platform, Striped $1.85@2.15
Chatillon's:
Eureka.....25%
Favorite.....40%
Grocers' Trip Scales.....50%
Chicago Scale Co.:
The "Little Detective," 25 lbs.....50%
Union or Family No. 2.....60%
Portable Platform (reduced list).....50%
Wagon or Stock (reduced list)....25@35%
Pelouze Scales—Household, Counter, Candy, Ice, Postal, Computing.....50%
"The Standard" Portables.....50%
"The Standard" R. R. and Wagon.....50%

Scrapers—

Box, 1 Handle.....*doz. $2.00@2.25*
Box, 2 Handle.....*doz. $2.60@2.85*
Ship Light, $2.00; Heavy, $1.50
Adjustable Box Scraper (S. R. & L. Co) $6.00.....30&30&10%
Chapin-Stephens Co., Box.....50&50&10%

Screens, Window, and Frames—

Flyer Pattern Screens...60&5&60&5&2½%
Maine Screen Frames.....40&10&5%
Perfection Screens.....60&5&60&5&2½%
Phillips' Screen Frames, 60&5&60&5&2½%
Porter's:
Fairview Screens.....60&5&60&5&2½%
Hummer Screens.....60&5&60&5&2½%
Klondike Screens.....60&5&60&5&2½%
See also *Doors.*

Screws—Bench and Hand—

Bench, Iron..doz. 1 in.. $2.50@2.75 : 1¼, $3.00@3.25: 1¼, $3.50@3.75
Bench, Wood, Beech....doz. 30@30&5
Hand, Wood.....30@30&5%
R. Bliss Mfg. Co., Hand.....30%
Chapin-Stephens Co., Hand.....30@30&10%
Ohio Tool Co., Bench and Hand.....30%

Coach, Lag and Hand Rail—

Lag, Common Point, list Oct. 1. '99.....80&5%
Coach and Lag, Gimlet Point, list Oct. 1, '99.....80%
Hand Rail, list Jan. 1, '81..70&10@75%

Jack Screws—

Standard List.....75&10@80&5%
Millers Falls.....50&10&10%
Millers Falls, Roller.....50&10%
P., S. & W.....50@50&5%
Sargent.....70%

Machine—

List Jan. 1, '98.
Flat or Round Head, Iron..50@50&10%
Flat or Round Head, Brass 50@50&10%

Set and Cap—

Set (Iron or Steel).....75% } *Extra*
Sq. Hd. Cap.....70% } *10&5*
Hex. Hd. Cap.....70% } *often*
Rd. or Fillister Hd. Cap 65% } *given.*

Wood—

List July 23, 1903.
Manufacturers' printed discounts :
Flat Head, Iron.....87½&10@10... %
Round Head, Iron.....85&10@10....%
Flat Head, Brass .....85&10@10....%
Round Head, Brass .....80&10@10....%
Flat Head, Bronze....77½&10@10....%
Round Head, Bronze.....75&10@10....%
Drive Screws.....87½&10%

Scroll Saws—See *Saws, Scroll.*

Scythes— *Per doz.*

Clipper Pattern, Grass...$4.25@$5.00
Full Polished Clipper.....$4.75@$5.50
Grain.....$7.00@$7.50
Clipper, Grain.....$7.75@$8.25
Weed and Bush.....$4.50@$5.00

Seeders— Raisin—

Enterprise.....25@30%

Sets— Awl and Tool—

Brad Awl and Tool Sets :
Wood Hdle., 10 Awls doz. $2.00@2.25
Wood Hdle., 14 Awls, 6 Tools doz. $2.50@2.60
Aiken's Sets, Awl and Tools :
No. 20, ₱ doz. $10.00.....50&10&10%
Fray's Adj. Tool H'dls...Nos. 1, $13; 2, $18; 3, $12; 4, $9; 5, $7.....50%
C. E. Jennings & Co.'s Model Tool Holders.....30&10%
Millers Falls Adj. Tool H'dls, No. 1, $12; No. 4, $12; No. 5, $18 .... 15&10%
Stanley's Excelsior :
No. 1, $7.50; No. 2 $4.00; No. 3, $5.50.....30@30&10&10%

Garden Tool Sets—

Ft. Madison, Three Pieces, Hoe, Rake and Shovel.....₱ dos. sets.....$9.00

Nail—

Square.....per gro. $2.25@2.50
Round, Blk. and Pol., assorted.....gro. $1.80@2.00
Octagon.....gro. $4.50@5.75
Buck Brothers.....37½%
Cannon's Diamond Point, ₱ gr. $12.....25%
Mayhew's.....per gro. $9.00
Snell's Corrugated, Cup Pt. per gro. $7.50
Snell's Knurled, Cup Pt....per gro $7.50

Rivet—

Regular list.....70&10@75%

Saw—

Aiken's:
Genuine.....50&10%
Imitation.....50&10%
Atkin's:
Criterion.....40%
Adjustable.....40%
Bemis & Call Co's.:
Cross Cut.....30%
Hammer, new Pat.....45%
Plate.....20%
Spring Hammer.....30%
Disston's Star and Monarch.....25%
Morrill's No. 1, $15.00.....50%
Nos. 3 and 4, Cross Cut, $20.63.....50%
No. 5, Mill, $30.00.....50%
Nos. 10, 11, 95, $15.63.....50%
No. 1 Old Style, $10.00.....50%
Special, $16.25.....50%
Giant Royal, Cross Cut .....₱ doz. $8.50
Royal, Hand.....₱ doz. $5.00
Taintor Positive. .....₱ dos $6.75

Shaving—

Fox Shaving Sets, No. 20, per doz, $24.00net

Sharpeners, Knife—

Chicago Wheel & Mfg. Co.....65%

Shaves, Spoke—

Iron.....doz. $1.00@1.15
Wood.....doz. $1.75@2.00
Bailey's (Stanley R. & L. Co.).....30@30&10&10%
Chapin-Stephens Co .....30@30&10&10%
Goodell's, ₱ doz. $9.00.....15&10%
Wood's F1 and F2.....50%

Shears—

Cast Iron...	*7*	*8*	*9 in.*
Best	*$16.00*	*18.00*	*20.00 gro.*
Good	*$13.00*	*15.00*	*17.00 gro.*
Cheap	*$5.00*	*6.00*	*7.00 gro.*

Straight Trimmers, etc.:
Best quality, Jap.....70@70&10%
" Nickel.....60@60&10%
Fair qual. Jap.....80@80&5%
" Nickel.....75@75&10%
Tailors' Shears.....40@40&10%
Acme Cast Shears.....40@40&5%
Heinisch's Tailors' Shears.....10%
Wilkinson's Hedge .....1900 list 45%
Wilkinson's Branch, Lawn and Border.....40%
Wilkinson's Sheep .....1900 list, 50%

Tinners' Snips—

Steel Blades .....20&5@20&10
Steel Laid Blades .....40&10@50%
Forged Handles, Steel Blades, Berlin .....40@40&10%
Heinisch's Snips 40%
Jennings & Griffin Mfg. Co.'s, 6¼ to 10 inch .....40@7½@10%
Niagara Snips 40%
P., S & W. Co. 20%
Triumph Pipe Shear.....₱ doz. 9.00

Pruning Shears and Tools—

Cronk's Grape Shears.....33⅓%
Cronk's Pruning Shears.....33⅓%
Disston's Combined Pruning Hook and Saw, ₱ doz. $18.00.....25%
Disston's Pruning Hook, ₱ doz. $12.00 .....25%
John T. Henry Mfg. Co.:
Pruning Shears, all grades.....40@40&5%
Orange Shears.....50&10@50&20%
Grape .....40&10@50%
Tree Pruners.....75%
P., S. & W. Co.....33⅓%

Sheaves—Sliding Door—

Stowell's Anti-Friction 50%
Patent Roller Hatfield's, Sargent's list, 70&10%
Reading.....50%
R. & E. list.....33⅓%
Wrightsville Hatfield Pattern.....50%

Sliding Shutter—

Reading list.....50%
R. & E. list.....33⅓%
Sargent's list.....50&10%

Shells—Shells, Empty—

Brass Shells, Empty :
First quality, all gauges.....60&5%
Climax, Club, Rival, 10 and 12 gauge.. 65&5%
Paper Shells, Empty :
Acme, Ideal, Leader, New Rapid, Magic 10, 12, 16 and 20 gauge..25&5%
Blue Rival, New Climax, Challenge, Monarch, Defiance, Repeater, Yellow Rival, 10, 12, 16 and 20 gauge.....20%
Climax, Union, League, New Rival 10 and 12 gauge.....25%
Climax, Union, League, New Rival, 14, 16 and 20 gauge ($7.50 list)..20%
Expert, Metal Lined and Pigeon, 10, 12, 16 and 20 gauge.....33⅓&5%
Robin Hood, Low Brass.....20&10%
Robin Hood, High Brass.....30&10%

Shells, Loaded—

Loaded with Black Powder 40%
Loaded with Smokeless Powder, medium grade.....40&5%
Loaded with Smokeless Powder, high grade.....40&10&10%
Robin Hood Smokeless Powder:
Robin Hood, Low Brass.....50%
Comets, High Brass.....50&10&5%

Shoes, Horse, Mule, &c.—

F. o. b., Pittsburg:
Iron.....per keg $3.85
Steel.....per keg 3.60
Burden's, all sizes, ₱ keg.....$3.90

Shot—

Drop, up to B, 25-lb. bag.....$1.60
Drop, B and larger, per 25-lb. bag $1.85
Buck, 25-lb. bag.....$1.85
Chilled, 25-lb. bag.....$1.85

Shovels and Spades—

Association List, Nov. 15, 1902....40%

Sieves and Sifters—

Hunter's Imitation, gro. $10.50@11.00
Buffalo Metallic Blued, S. S. Co., ₱ gr.:

14&16	16&18	18&20
$13.20	$13.50	$14.40

National Mfg. Co.:
Victor.....per gro. $12.00
Surprise.....per gro. $11.00
No Name.....per gro. $11 00
Shaker Barler's Pat.) Flour Sifters.. ₱ doz., $2.00.....30%

Sieves, Tin Rim—

Per dozen.

Mesh	*14*	*16*	*18*	*20*
Black, full size	*$1.20*	*1.25*	*.30*	*1.35*
Plated, full size	*$1.30*	*1.35*	*1.40*	*1.45*
Black, scant		*$6.95*	*1.00*	*1.05*

Sieves, Wooden Rim—

Nested, 10, 11 and 12 Inch.
Mesh 18, Nested, doz.....$0.90@0.95
Mesh 20, Nested, doz.....1.00@1.05
Mesh 24, Nested, doz.....1.30@1.40

Sinks—

Cast Iron—

Standard list.....60@60&10%
NOTE.—*There is not entire uniformity lists used by jobbers.*

Skeins, Wagon—

Cast Iron.....75@75&10%
Steel.....50@40&10%

Slates, School—

Factory Shipments.
"D" Slates.....40&10%
Noiseless Slates.....60&5 tens

Slaw Cutters—See *Cutters.*

Slicers, Vegetable—

Sterling No, 10, $2.00.....33⅓

Snaps, Harness—

German.....40@40&10%
Covert Mfg. Co.:
Derby.....30&5&2%
High Grade.....45%
Jockey.....30&10%
Trojan.....45%
Yankee.....30&5&2%
Yankee, Roller.....30&5&2%
Covert's Saddlery Works:
Crown.....60%
German.....60%
Model.....60%
Triumph.....60%
Oneida Community
Solid Swivel.....60%
Sargent's Patent Guarded .....66⅔&10%

Snaths—

Scythe.....45%

Snips, Tinners'—See *Shears.*

Spoons and Forks—

Silver Plated—

Good Quality..... 50&10@60&5%
Cheap..... 40@50&10%
International Silver Co.
1847 Rogers Bros. and Rogers & Hamilton.....40&10%
Rogers & Bro., William Rogers Eagle Brand.....50&10%
Anchor, Rogers Brand.....60%
Wm. Rogers & Son.....60&10%
Simeon L. & Geo. H. Rogers Co.:
Silver Plated Flat Ware.....60%
No. 77 Silver Plated Ware.....60&10%

Miscellaneous—

German Silver..... 60@60&5%
Cattaraugus Cutlery Co.:
Yukon Silver.....50%
Simeon L. & Geo. H. Rogers Co.:
German or Nickel Silver, Special list 5 & 10%

Tinned Iron—

Teas.....per gro. 45@50c
Tables..... per gro. 90c@$1.00

Springs—Door—

Chicago (Coil).....40&10%
Gem (Coil).....20%
Reliance (Coil).....40&10%
Star (Coil).....30%
Torrey's Rod, 39 in.....₱ doz. $1.10
Victor (Coil).....50&10&10%

Carriage, Wagon, &c.

1¼ in. and Wider :
Black or ⅛ Bright, lb.....4¾@5 c
Bright, lb. .....5¼@5½c
Painted Seat Springs :
1½ x 2x 26. per pr.....50@55c
1½ x 2 x 28 per pr.. .....60@65c
1½ x 3 x 28 and narrower, per pr. 80@85c

Sprinklers, Lawn—

Enterprise.....25@30%
Philadelphia No. 1, ₱ dos. $12; No. 2, $15; No. 3, $24.....30%

Squares—

Nickel plated.... } List Jan. 5, 1900.
Steel and Iron.... } 70&10@70&10&10%
Rosewood Hdl Try Square and T-Bevels .....60&10&10@70%
Iron Hdl. Try Squares and T-Bevels. 50&10@50&10&10%
Disston's Try Sq. and T-Bevels.....70%
Winterbottom's Try and Miter..... 40&10@40&10&10%

Squeezers—Lemon—

Wood, Common, gro., No. 0, $5.25 @5.50 : No. 1. $6.25@6.50.
Wood, Porcelain Lined, Cheap .....doz. $1.00
Good Grade.....doz. $1.25
Tinned Iron.....doz. $0.75@1.25
Iron, Porcelain Lined.....doz. $1.75

Staples—

Barbed Blind. .....lb. 6@6½c
Electricians', Association list..... 80&10&10&10%
Fence Staples, Plain $2.25; Galvanized.....$2.55
Poultry Netting, Staples....per lb.. 3¼@3½c
Grand Crossing Tack Co.'s list....80&10%

Steels, Butchers'—

Dick's.....30%
Foster Bros'.....30%
C. & A. Hoffmann's.....40%

Steelyards.....30@30&10%

Stocks and Dies—

Blacksmiths'.....50@50&10%
Curtis Reversible Ratchet Die Stock.25%
Derby Screw Plates.....25%
Gardner Die Stocks No. 1.....50%
Gardner Die Stocks, larger sizes.....40%
Green River.....25%
Lightning Screw Plate.....25%
Little Giant.....25%
Reece's New Screw Plates.....25@30%

Stone—

Scythe Stones—

Chicago Wheel & Mfg. Co:
Gem Corundum, 10 inch, $3.00 per gro., 12 inch, $3.80
Norton Emery Scythe Stones:
Less than gross lots.....₱ gro, $9.00
One gross or more.....₱ gro. $7.20
Lots of 10 gross or more....₱ gro $6.00
Pike Mfg. Co. 1901 list:
Black Diamond S. S....₱ gro. $12.00
Lamoille S. S .....₱ gro. $11.00
White Mountain S. S....₱ gro. $9.00
Green Mountain S. S....₱ gro. $6.00
Extra Indian Pond S. S. ₱ gro. $7.50
No. 1 Indian Pond S. S..₱ gro. $7.00
No. 2 Indian Pond S. S..₱ gro. $4.50
Leader Red End S. S....₱ gro. $4.50
Balance of 1901 list 33⅓% } 40%
Oil Stones, &c.
Chicago Wheel & Mfg. Co., 1901 list:
Gem Corundum Oil, Double Grit.....50%
Gem Corundum Axe, Single or Double Grit.....55%
Gem Corundum Slips.....55%
Gem Corundum Razor Hones.....50%
Pike Mfg. Co. 1901 list: ₱ lb.
Arkansas Stone, No. 1, 3 to 5¼ in. $2.80
Arkansas Stone, No. 1, 5¼ to 8 in. $3.50
Arkansas Slips No. 1 .....$4.00
Lily White Washita 4 to 8 in.....60¢
Rosy Red Washita, 4 to 8 in .....60¢
Washita Stone, Extra, 4 to 8 in..50¢
Washita Stone, No. 1, 4 to 8 in..40¢
Washita Stone, No. 2, 4 to 8 in..30¢
Lily White Slips.....90¢
Rosy Red Slips.....90¢
Washita Slips, Extra.....80¢
Washita Slips, No. 1.....70¢
India Oil Stones (entire list) .....33⅓% } 33⅓%
Hindostan No. 1, Regular....₱ lb 8¢
Hindostan No. 1 Small.....₱ lb 10¢
Axe Stones (all kinds) .....
Turkey Oil Stones, ex. 5 to 8 in. ₱ lb 80c
Queer Creek Stones, 4 to 8 in.....20¢
Queer Creek Slips.....40¢
Sand Stone.....5¢ } 40%
Belgian, German and Swaty Razor Hones.....50%
Natural Grit Carving Knife Hones, ₱ doz.....$3.00
Quick Edge Pocket Knife Hones, ₱ doz.....$3.00
Mounted Kitchen Sand Stone, ₱ doz.....$1.50 } 40%

Stoners—Cherry—

Enterprise.....25@30%

Stops, Bench—

Millers Falls.....15&10%
Morrill's...₱ doz., No. 1, $10.00.....50%
Morrill's, No. 2, $12.50.....50%
Whipple's Combination.....₱ doz. $2.50

Door—

Chapin-Stephens Co.....60@60&10%

Plane—

Chapin-Stephens Co.....20%

Straps—Box—

Cary's Universal, case lots....20&10&10%

Hame—

Covert's Saddlery Works.....60&10%

Stretchers, Carpet—

Cast Iron, Steel Points....doz. 55@60c
Socket.....doz. $1.75
Excelsior Stretcher and Tack Hammer Combined, per doz. $6.....20%

Stuffers, Sausage—

Enterprise Mfg. Co.....25@25&7½%
National Specialty Mfg. Co., list Jan. 1, 1902.....30&5%

Sweepers, Carpet—

National Sweeper Co.: Per doz.
Auditorium, Roller Bearing (26 in case), Nickel.....$54.00
Mammoth, Roller Bearing (30 in case), Nickel.....$60.00
Marion, Roller Bearing, regular finishes, full Nickel.....$24.00
Marion Queen, Roller Bearing, full Nickel.....$24.00
Monarch, Roller Bearing, Nickel..$22.00
Monarch, Roller Bearing, Jap'ned.$20.00
Transparent, Roller Bearing, Plate Glass Top, Nickel.....$36.00
Monarch Extra, Roller Bearing, (17-inch case), Nickel.....$36.00
Monarch Extra, Roller Bearing (17-inch case), Japanned.....$33.00
National Queen, Fancy Veneers..$27.50
Perpetual, Regular Bearings, Nkl.$20.00
Perpetual, Regular Bearings, Jap.$18.00
NOTE.—*Rebates: 30c per dozen on three-dozen lots; $1 per dozen on five-dozen lots; $2 per dozen on ten-dozen lots; $2.50 per dozen on twenty-five-dozen lots.*

Tacks, Brads, &c.—

List Jan. 15, '99.
Carpet Tacks.....90&40&10@.....%
American Cut Tacks....90&25@.....%
Swedes Iron Tacks. 90&30&10&5@.....%
Swedes Upholsterers' Tacks..... 90&45&10&5@.....%
Gimp Tacks.....90&45&10@.....%
Lace Tacks.....90&45&10@.....%
Trimmers' Tacks..90&30&10&5@.....%
Looking Glass Tacks. 70&10&5@.....%
Bill Posters' and Railroad Tacks... 90&45&@10.....%
Hungarian Nails ....80&30&5@.....%
Common and Patent Brads..... 80&10&5@.....%
Trunk and Clout Nails..80&10@.....%
NOTE.—*The above prices are for Straight Weights.* An extra 5% is given Star Weights** and an extra 10&5% on Standard Weights.****

Miscellaneous—

Double Pointed Tacks. 90 & 6 tens & 5%
Steel Wire Brads, R. & E. Mfg. Co.'s list.. 50&10@60%
See also *Nails, Wire.*

Tanks, Oil—

	Each.
Emerald, S. S. & Co.	30-gal $3.25
Emerald, S. S. & Co.	60-gal., $4.00
Queen City S. S. & Co., 30-gal.	$3.65
Queen City S. S. & Co., 60-gal.	$4.50

Tapes, Measuring—

American Asses' Skin.....40&10@50%
Patent Leather.....25@30&5%
Steel.....40@40&10%
Chesterman's.....20@25&5%
Eddy Asses' Skin.....40&10&50%
Eddy Patent Leather..... 25@30&5%
Eddy Steel .....4%@40&10%
Keuffel & Esser Co., Steel and Metallic, Lower list, 1899..... 35%
Lufkin's Steel.....33⅓@35%
Lufkin's Metallic.....30@30&5%

Teeth, Harrow—

Steel Harrow Teeth, plain or headed, ⅝-inch and larger, per 100 lbs...$3.00

Thermometers—

Tin Case.....80&10@80&10&5%

Ties, Bale—Steel Wire.

Single Loop..... .....30&2¼
Monitor, Cross Head, Etc.....70%

Brick Ties—

Niagara Brick Ties.....30&10%

Tinners' Shears, &c.—

See *Shears, Tinners'.*

Tinware—

Stamped, Japanned and Pieced, sold very generally at net prices.

Tips, Safety Pole—

Covert's Saddlery Works.....60&10%

Tire Benders, Upsetters, &c.—

See *Benders and Upsetters, Tire.*

Tools—Coopers'—
L. & I. J. White .....20@20&5%

Hay—
Myers' Hay Tools 50%
Stowell's Hay Carriers 5%
Stowell's Hay Forks 50%
Stowell's Fork Pulleys 5%

Saw—
Atkins' Cross Cut Saw Tools 40%
Simonds' Improved 33⅓%
Simonds' Crescent 25%

Ship—
L. & I. J. White 25%

Transom Lifters—
See *Lifters, Transom.*

Traps—Fly—
Balloon, Globe or Acme .....
doz. $1.15@1.25 ; gro. $11.50@12.00
Harper, Champion or Paragon ..
doz. $1.25@1.50 ; gro. $13.00@13 50

Game—
Oneida Pattern .... 75c@10@75c@10c&5%
Newhouse .....45@45&5%
Hawley & Norton .....65@65&5%
Victor (Oneida Pattern) .....75@75&5%
O.C. Jump (Blake Pattern) 60&5@60&10%

Mouse and Rat—
Mouse, Wood, Choker, doz. holes ....
8½@9c
Mouse, Round or Square Wire .....
doz. 85@90c
Marty French Rat and Mouse Traps (Genuine):
No. 1, Rat, Each $1.12½; ₩ doz. $12.00
No. 3, Rat, ₩ doz. $6.00; case of 50 $5.25 doz.
No. 3½, Rat, ₩ doz. $4.75; case of 72 $4.25 doz.
No. 4, Mouse, ₩ doz. $3.50; case of 7 $2.75 doz.
No. 5, Mouse, ₩ doz. $2.75; case of 150 $2.25
Schuyler's Rat Killer, No. 1, ₩ gr. $30.00
No. 2, ₩ gr. $30.00; Mouse, No. 3, $18.00 .....50%
J. M Mast Mfg. Co.: Per gro.

	Mouse.	Rat.
Blizzard	No. 12, $3.00	No. 1, $9 50
Old Nick	No. 20, 2.22	No. 2, 8.40
Joker	No. 5, 2 10	No. 3, 8.40

Imp'd Snap Shot, Mouse, per gro., 2 hole, $2 40.
Imp'd Snap Shot, Mouse, per gro., 4 hole, $4.20.

Trimmers. Spoke—
Bonney's Nos. 1 and 2 .....33⅓%
Wood's E I 50%

Trowels—
Disston Brick and Pointing 30%
Disston Plastering 25%
Disston "Standard Brand" and Garden Trowels 35%
Kohler's Steel Garden Trowels, 5 in. ₩ gro. $5.00
Kohler's Steel Garden Trowels, 6 in ₩ gro. $6.00
Never-Break Steel Garden Trowels ... gro. $4.00
Rose Brick and Plastering .....25&5%
Woodrough & McFarlin, Plastering .25%

Trucks, Warehouse, &c.—
B. & I., Block Co.:
New York Pattern .....30&10%
Western Pattern .....60&10%
Handy Trucks .....per doz. $16.00
Grocery .....per doz. $15.00
Daisy Stove Trucks, Improved pattern ₩ doz. $18.50
Model Stove Trucks .....₩ doz. $18.50

Tubs, Wash—

	No. 1	2	3
Galvanized, per doz.	*$5.00*	*5 50*	*6.25*
Galvanized Wash Tubs (S. S. & Co.):			
No. 1	2	10	20
Per doz., net	$5.70	6.90	7.20
	30		
	6.30	7 20	8.10

Twine—Miscellaneous—

Flax Twine—	*BC*	*B.*
No. 9, ¼ and ½-lb. Balls	*..22c@24c*	
No. 12, ¼ and ½ lb. balls	*..18c@20c*	
No. 18, ¼ and ½-lb. Balls	*..16c@18c*	
No. 24, ¼ and ½-lb. Balls	*..16c@18c*	
No. 36, ¼ and ½-lb. Balls	*..15c@17c*	

Chalk Line, Cotton, ½-lb Balls 30c
Cotton Mops, 6, 9, 12 and 15 lb. to doz .....10@12c
Cotton Wrapping 5 Balls to lb ... according to quality. ....16c@25c
American 2-Ply Hemp, ¼ and ½-lb. Balls .....13@14c
American 3 Ply Hemp, 1-lb. Balls.. 13@14c
India 2-Ply Hemp, ¼ and ½-lb. Balls (Spring Twine) 9c
India 3-Ply Hemp, 1-lb. Balls, ...9c
India 3-Ply Hemp, 1½-lb. Balls... .8c
2, 3, 4 and 5-Ply Jute, ½-lb. Balls... 9@10c
Mason Line, Linen, ½-lb. Balls...16c
No. 20½ Mattress, ¼ and ½-lb Balls.37c
Wool, 3 to 6 ply .....5½@6c

Vises—
Solid Box ..... 50c@10@60%

Parallel—
Athol Machine Co :
Simpson's Adjustable 40%
Standard 40%
Amateur 25%
Bonney's 33⅓%
Columbian Hdw Co 40%
Emmert Universal:
Pattern Makers' No. 1 .....$15.00
Pattern Makers' No 2 .....$12.50
Machinist and Tool Makers' No. 4. $12.50
Fisher & Norris Double Screw ....15&10%
Hollands':
Machinists' .....40@40&5%
Keystone .....65&5@70%
Lewis Tool Co .....20@30%
Merrill's 20%
Miller's Falls .....60&10%
Massey Vise Co.:
Clincher 40%
Perfect 30%
Lightning Grip 30%
Parker's:
Victor .....20@25%
Regular .....20@25%
Vulcan's .....40@45%
Combination Pipe .....55@60%
Prentiss .....20@25%
Sargent's 40%
Smith & Hemenway Co.:
Machinists 40%
Jewelers 33⅓%
Snediker's X. L 33⅓%
Stephens' 33⅓%

Saw Filers'—
Bonney's, No. 1, $13; No. 3, $16 ....40%
Disston's D 8 Clamp and Guide, ₩ doz $30 .....25%
Perfection Saw Clamps, ₩ doz. $8.00
Reading 60%
Wentworth's Rubber Jaw, Nos. 1, 2 and 3 .....45&50%

Wood Workers'—
Massey Vise Co.:
Lightning Grip 15%
Perfect 15%
Wyman & Gordon's Quick Action, 6 in., $6.00 ; 9 in., $7.00 ; 14 in., $8.00.

Miscellaneous—
Bignall & Keeler Combination Pipe Vise 60%
Hollands' Combination Pipe ....60@60&5%
Massey's Quick Action Pipe 40%
Parker's Combination Pipe:
87 Series 60%
187 Series .....60&5%
No. 870 .....40%

Wads—Price Per M.

B. E., 11 up	*60c*
B. E., 9 and 10	*70c*
B. E., 8	*80c*
B. E., 7	*80c*
P. E., 11 up	*$1.00*
P. E., 9 and 10	*1.25*
P. E., 8	*1.50*
P. E., 7	*1.50*
Ely's B. E., 11 and larger	*$1.70@1.75*
Ely's P. E., 12 to 20	*$3.00@3.25*

Dis. 15%

Ware, Hollow—
Cast Iron, Hollow—
Stove Hollow Ware :
Enameled ..... 55c@10@60%
Ground .....60c@10@65%
Plain or Unground .....65c@10@70%
Country Hollowware per 100 lbs., $2 50
White Enameled Ware :
Maslin Kettles 70%
Covered Ware :
Tinned and Turned 40%
Enameled 50%
See also *Pots Glue.*

Enameled—
Agate Nickel Steel Ware .....50&20
Agate Nickel Steel Ware, Specials .... 60&15%
Iron Clad Ware .....70&10%
Lava, Enameled .....40&10%
Never Break Enameled 50%

Tea Kettles—
Galvanized Tea Kettles :

Inch	*6*	*7*	*8*	*9*
Each	*45c*	*50c*	*55c*	*65c*

Steel Hollow Ware.
Avery Spiders & Griddles .....65@65&5%
Avery Kettles 60%
Porcelained .....50&5@50&10%
Never Break Spiders and Griddles .... 65&5%
Never Break Kettles 60%
Solid Steel Spiders & Griddles. ....65&5%
Solid Steel Kettles 60%

Warmers, Foot—
Pike Mfg. Co., Soapstone .....40@40&10%

Washboards—
Solid Zinc: ₩ doz
Crescent, family size, bent frame. $3.00
Red Star, family size, stationary protector $3.00
Double Zinc Surface :
Saginaw Globe, family size, stationary protector $2.65
Cable Cross, family size, stationary protector $2.90
Single Zinc Surface :
Salad, familysize, open back perforated $2.40
Saginaw Globe, protector, family size, ventilated back $2.25
Brass Surface:
Brass King, Single Surface, open back $3.00
Nickel Plate Surface :
No. 1001 Nickel Plate, Single Surface $3.00

Washers—
Leather, Axle—
Solid .....80c@10@80c@10c@10%
Patent .....90c@90c&5%
Coil: ⅛ 1 1½ 1¾ Inch.
11c 12c 13c 14c per box

Iron or Steel—
Size bolt .... 5-16 ⅜ ½ ⅝ ¾
Washers $5.10 4.20 2.90 2.70 2.50
In lots less than one keg add ½c per lb., 5-lb. boxes add ½c to list.

Cast Washers—
Over ½ inch. barrel lots, per lb 1¾@2c

Waterers, Hog—
Improved Dewey, ₩ doz $13.00

Wedges—
Oil Finish .....lb. 2.35@2.40c

Weights—

Hitching—
Covert M'f'g. Co .....40&2%
Covert's Saddlery Works .....60&10%

Sash—
Per ton, f.o.b. factory :
Eastern District $23.00
Western, Central and Southern Districts market unsettled, prices ranging from $19.00@20.00

Wheels, Well—
8-in., $1.6 @1.80; 10-in., $2.00@2.25; 12-in., $2.15@2.65; 14-in., $4.00@4.25

Wire and Wire Goods—
Bright and Annealed :

6 to 9	*75@75&10%*
10 to 18	*75c@75c@10c@5%*
19 to 26	*75c@10c@10@80c@5%*
27 to 36	*75c@10c@7½@80c@2½%*
Galvanized :	
6 to 9	*70c@5@70c@10%*
10 to 18	*70c@5@70c@10%*
19 to 26	*72½@72½@5%*
27 to 36	*70@70c@5%*
Coppered :	
6 to 9	*70c@5@70c@10%*
10 to 18	*70c@10@70c@10c@5%*
19 to 26	*72½@10@75%*
27 to 36	*70@70c@5%*
Tinned :	
6 to 14	*72½@10@75%*
15 to 18	*70c@10@70c@10c@5%*
19 to 26	*65c@10c@10@70%*
27 to 36	*60@60c@10%*
Annealed, Steel and Tinned, on Spools	*.70@70c@10%*
Brass & Copper on Spools	*60@60c@10%*
Brass, list Feb. 26, '96	*30%*
Copper, list Feb. 26, '96	*15%*
Cast Steel Wire	*50%*

Wire Clothes Line, see *Lines.*
Wire Picture Cord, see *Cord.*

Bright Wire Goods—
List June 24, 1903..90c@10@90c@10c@10%

Wire Cloth and Netting—
Galvanized Wire Netting ..... 80c@10@80c@10c@5%
Painted Screen Cloth, per 100 ft. $1.25
Standard Galv. Hardware Grade :
Nos. 2, 2½ and 3 Mesh, sq. ft..... 3c
Nos. 4 and 5 Mesh, sq. ft..... 3½c
No. 6 Mesh, sq ft 3½c
No. 8 Mesh, sq ft 4c

Wire Barb—See Trade Report.

Wrenches—
Agricultural .....80c@5@80c@10%
Baxter Pat'rn S Wrenches 70c@5@70c@10%
Drop Forged S .....45@45c@5%
Acme .....60&10%
Alligator 70%
Alligator Pattern 70%
Bull Dog 70%
Bemis & Call's:
Adjustable S .....35&5%
Adjustable S Pipe 40%
Brigg's Pattern .....30&10%
Combination Black .....40&5%
Combination Bright 40%
Merrick's Pattern 50%
No. 3 Pipe, Bright 55%
Boardman's 33⅓%
Coes' Genuine Knife Hdl. ....40&10&5&5%
Coes' Genuine Steel Hdl. ....40&10&5&5%
Coes' Genuine Key Model ...40&10&5&5%
Coes' "Mechanics' ....40&10&10&5&5%
Donohue's Engineer .....40&10%
Dudly Combination .....50&10&5%
Dudly Pipe .....50&10&5%
Dudly Adjustable Pipe .....40&10&5%
Eagle .....50&10%
Elgin Wrenches 40%
Elgin Monkey Wrench Pipe Jaws...33⅓%
Gem Pocket 30%
Hercules 70%
W. & B. Machinist:
Case lots .....50&5%
Less than case lots 70%
Improved Pipe (W & B.) 60%
Solid Handles, P.S. & W .... 50@50&5%
Stillson 65%
Triumph .....60&10%
Vulcan Chain 50%

Fruit Jar—
T & B Fruit Jar Wrenches ....₩ gro $9.00
Triumph Fruit Can Wrenches, ₩ gro $9.00
Triumph Fruit Jar Holders ..₩ gro. $15.00

Wrought Goods—
Staples, Hooks, &c., list March 17 '02 .....90@90c&5%

Yokes, Neck—
Covert Saddlery Works, Trimmed....70%
Covert Saddlery Works, Neck Yoke Centers 70%

Yokes, Ox, and Ox Bows—
Fort Madison's Farmers & Freighters' .. list net

Zinc—
Sheet ..... per 100 lbs. $6 45@6.70

PAINTS, OILS AND COLORS

White Lead, Zinc, &c.
Lead, English white, in Oil..... 9½@ 9¼
Lead, American White, in Oil:
Lots of 500 ℔ or over ..... @ 6¼
Lots less than 500 ℔ ..... @ 7
In Barrels ..... @ 6
Lead, White, in oil, 25 ℔ tin pails, add to keg price ..... @ ½
Lead, White, in oil, 12½ ℔ tin pails, add to keg price ..... @ 1
Lead, White, in oil, 1 to 5 ℔ assorted tins, add to keg price ... @ 1½
Lead, American, Terms: For lots 12 tons and over ½¢ rebate ; and 2% for cash if paid in 15 days from date of invoice ; for lots of 500 lbs. and over 2% for cash if paid in 15 days from date of invoice; for lots of less than 500 lbs. net.
Lead White, Dry in bbls ..... @ 6
Zinc, American, dry ..... ₩ ℔ 4½@ 4¾
Zinc, Paris, Red Seal, dry ..... @ 8½
Zinc, Paris, Green Seal, dry ..... @ 9¼
Zinc, Antwerp Red Seal, dry ..... @ 6¾
Zinc, Antwerp, Green seal, dry .. @ 8½
Zinc, V. M. French, in Poppy Oil, Green Seal:
Lots of 1 ton and over ..... 12 @12½
Lots of less than 1 ton ..... 12¾@12¾
Zinc, V. M French, in Poppy Oil, Red Seal:
Lots of 1 ton and over ..... 10¾@11¼
Lots of less than 1 ton ..... 11@11¾
DISCOUNTS.—V. M. French Zinc.—Discounts to buyers of 10 bbl. lots of one or assorted grades, 1%; 25 bbls., 2%; 50 bb'ls., 4%.

Dry Colors.
Black, Carbon ..... ₩ ℔ 5 @10
Black, Drop, Amer ..... 4 @ 6
Black, Drop, Eng ..... 5 @15
Black, Ivory ..... 16 @20
Lamp, Com ..... 4½@ 6
Blue, Celestial ..... ₩ ℔ 4 @ 6
Blue, Chinese ..... 29 @32
Blue, Prussian ..... 27 @30
Blue, Ultramarine ..... 4½@15
Brown, Spanish ..... ½@ 1
Carmine, No. 40 ..... ₩ ℔ $3.75@4.00
Green, Chrome, ordinary ..... 3½@ 6
Green, Chrome, pure ..... 17 @35
Lead, Red, bbls. ½ bbls. and kegs:
Lots 500 ℔ or over ..... @ 6¼
Lots less than 500 ℔ ..... @ 7
Litharge, bbls. ½ bbls. and kegs:
Lots 500 ℔ or over ..... @ 6¼
Lots less than 500 ℔ ..... @ 7
Ocher, American ..... ₩ ton $8.50@16.00
Orcher, American Golden ..... 2½@ 3
Orcher, French ..... 1½@ 2½
Orcher, Foreign Golden ..... 3 @ 4
Orange Mineral, English ..₩ ℔ 9 @11
Orange Mineral, French .. 10¾@11¼
Orange Mineral, German ..... 6¾@ 9
Orange Mineral, American .... 8 @ 8½
Red, Indian, English ..... 4½@ 8½
Red, Indian, American ..... 3 @ 3½
Red, Turkey, English ..... 4 @ 6
Red, Tuscan, English ..... 7 @10
Red, Venetian, Amer. ₩ 100 ℔ .$0.50@1.50
Red Venetian, English. ₩ 100 ℔ 1.25@1 75
Sienna, Italian, Burnt and Powdered ..... ₩ ℔ 3 @ 6½
Sienna, Ital., Raw, Powd ..... 3 @ 6½
Sienna, American, Raw ..... 1½@ 2
Sienna, American, Burnt and Powdered ..... ₩ ℔ 1½@ 2
Talc, French ..... ₩ ℔ 1 @ 1½
Talc, American ..... 75 @1.25
Terra Alba, French, ₩ 100 ℔ . 95 @1.00
Terra Alba, English ..... 05 @1.00
Terra Alba, American No. 1 .... 75 @85
Terra Alba, American No. 2 .... 45 @50
Umber, Turkey, Bnt. & Pow. ₩ ℔ 2½@ 3½
Umber, Turkey, Raw & Powd. 2½@ 3½
Umber, Bnt. Amer ..... 1½@ 2
Umber, Raw, Amer ..... 1½@ 2
Yellow, Chrome ..... 11 @14
Vermilion, American Lead .... 10 @25
Vermilion, Quicksilver, bulk ... @70
Vermilion, Quicksilver, bags ... @71
Vermilion, English, Import .. 80 @85
Vermilion, Chinese .... $0.90@1.00

Colors in Oil.
Black, Lampblack ..... 12 @14
Blue, Chinese ..... 36 @46
Blue, Prussian ..... 32 @38
Blue, Ultramarine ..... 13 @18
Brown, Vandyke ..... 11 @14
Green, Chrome ..... 10 @15
Green, Paris ..... @24
Sienna, Raw ..... 12 @15
Sienna, Burnt ..... 12 @15
Umber, Raw ..... 11 @14
Umber, Burnt ..... 11 @14

Miscellaneous.
Barytes, White Foreign, ₩ ton $17.50@20.00
Barytes Amer. floated .... 18.50@20.00
Barytes, Crude, No. 1 ..... 10.00@11.00
Chalk, in bulk ..... ₩ ton 3.00@ 3.25
Chalk, in bbls ..... @ 35
China Clay, English .. ₩ ton 11.00@17.00
Cobalt, Oxide ..... ₩ 100 ℔ 3.50@ ...
Whiting, Common. ₩ 100 ℔ .45@ .48
Whiting, Gilders ..... .55@ .57
Whiting, extra Gilders' .... .58@ .60

Putty.
In bladders ..... 1¾@2¼
In bulk ..... 1¼@2
In cans 1 ℔ to 5 ℔ ..... 2¼@4¼
In cans 12½ ℔ to 25 ℔ ..... 1¾@2¼

Spirits Turpentine.
In Oil bbls ..... 58 @58½
In machine bbls ..... 58½@59

Glue.
Cabinet ..... ₩ ℔ 11 @15
Common Bone ..... 6 @ 8
Extra White ..... 18 @24
Foot Stock, White ..... 11 @14
Foot Stock, Brown ..... 7 @10
German Hides ..... 12 @18
French ..... 10 @40
Irish ..... 13 @16
Low Grade ..... 8 @11
Medium White ..... 14 @17

Gum Shellac— Cts. per lb.
Bleached, Commercial ..... 45 @...
Bone Dried ..... 56 @...
Button ..... 50 @60
Diamond I ..... 60 @...
Fine Orange ..... 53 @58
A. C. Garnet ..... 47 @48
D. C ..... 95 @...
Octagon B ..... 57 @78
T. N ..... 51 @53
V. S. O ..... 63 @65

Animal, Fish and Vegetable Oils.
Linseed, City, raw ..... ₩ gal. .42 @43
Linseed, City, boiled ..... 44 @45
Linseed, State and West'n, raw 38 @40
Linseed, raw Calcutta seed ..... @65
Lard, Prime, Winter ..... 57 @58
Lard, Extra No. 1 ..... .50 @52
Lard, No. 2 ..... .37 @40
Cotton-seed, Crude, f.o.b mills. 21 @22
Cotton-seed, Summer Yellow, prime ..... 27½@29
Cotton-seed Summer Yellow, off grades ..... .27 @28
Sperm, Crude ..... @55
Sperm, Natural Spring ..... 60 @62
Sperm, Bleached Spring ..... 62 @63
Sperm, Natural Winter ..... 63 @65
Sperm, Bleached Winter ..... 65 @67
Tallow, Prime ..... 48 @49
Whale, Crude ..... @47
Whale, Natural Winter ..... 46 @47
Whale Bleached Winter ..... 48 @49
Menhaden, Brown, Strained .. .31 @32
Menhaden, Light Strained ..... .32 @33
Menhaden, Bleached Winter .. .34 @35
Menhaden, Ex Bleached Winter 36 @37
Cocoanut, Ceylon .... 6 @ 6½
Cocoanut, Cochin ..... 6¾@ 7¼
Cod, Domestic ..... 39 @40
Cod, Newfoundland ..... 40 @41
Red Elaine ..... 44 @45
Red Saponified ..... ₩ ℔ 4 @ 4½
Olive, Italian, bbls ..... 49 @ 51
Neatsfoot prime ..... .54 @ ...
Palm, prime, Lagos ..... ₩ ℔ 6 @ 6¼

Mineral Oils.
Black, 20 gravity, 25@30 cold test ..... ₩ gal. 13 @14
Black, 29 gravity, 15 cold test. 14 @15
Black, Summer ..... 13 @14
Cylinder, light filtered ..... 20½@21½
Cylinder, dark filtered ..... 18½@19½
Paraffine, 903-907 gravity ..... 15 @15½
Paraffine, 903 gravity ..... 14 @14½
Paraffine, 885 gravity ..... 11¾@12½
Paraffine, red ..... 14 @15½
In small lots ½¢ advance.